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Developing a tool predicting competitive reaction to a price increase

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The present study was implemented in order to help the case company to predict a competitive pricing reaction. Predicting the competitive reaction is important as the case company loses market share and may lose profit if competitiors do not follow the company's price increases.

The study included an analysis of the current approach to competitive reaction, as well as oligopolistic theory and tacit collusion. Interviews with corporate pricing decision makers and analysis of actual market data were carried out in the study.

The outcome of the study was a tool predicting competitive reaction to price increase. The tool includes two parts. The first part is a table with factors found to be making a significant impact on competitive pricing reaction. The second part is a total impact which is a sum of impacts of the significant factors. If the tool's total impact is above zero then the competitors are likely to follow the price increase of the case company and, consequently, the latter can increase prices. If the tool's total impact is below zero then the competitors are likely not to follow the price increase of the case company. Thus, the latter should retain from price lifting.

Keywords	oligopoly, tacit collusion, competitive reaction, pricing

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Introduction

The case company explored in this Thesis is Baltika breweries, a leading Russian beer manufacturer, part of a global beer market player. The addressed business challenge is lack of understanding of competitive reaction to the case company's price increases.

The challenge is impactful for the case company's business: if competitors do not follow a price increase then the company loses its market share and may lose profit. The acuteness of the challenge is recognized by the corporate management, its solution is highly desirable.

Nevertheless, currently accepted approach is to simplistically expect that competitors will follow a price increase. According to the analysis of actual corporate performance (subchapter 3.1.4 "Analysis of secondary data") this approach leads to loss of market share and profit when competitors do not follow .

The solution which I offer to solve the business challenge is a tool predicting competitive reaction to case company's price increase. Conceptual basis of the tool is elaborated within oligopolistic theory, specifically, within domain of tacit collusion.

A number of factors retrieved from body of knowledge form an initial list of factors which shape orientation to collusion. According to interviews with corporate pricing decision makers, the factors not significant for the case company are excluded, significant factors outside of the initial list are added.

The tool being developed consists of the significant factors, their impacts on collusive orientation and total impact which is a sum of individual impacts of factors. If the sum is positive then competitors are likely to follow the case company's price increase, therefore the case company can increase prices. If the sum is negative then competitors are likely not to follow the case company's price increase, consequently the case company should retain from price lifting.

As soon as oligopolization is widespread in modern business environment and problem of competitive pricing reaction is acute (Suarez-Villa 2016), the tool can be applied not only to the case company but also to many other oligopolistic businesses. The

prerequisite for the tool application to other businesses is reconsideration of significant factors in context of specific business.

1.1 Case Company Background

The company studied in this Thesis is a large Russian beer producer. Its core business is concentrated in Russian market, while export represents a minor part of sales (Baltika breweries corporate website).

The company was founded in the 1990, in the first years of capitalism in Russian market, and, enjoying the role of a first-mover in brand marketed brewing, became a market leader in 1996 (Baltika breweries corporate website).

The dominant position was reinforced by mergers and acquisitions. Currently market share of the company is close to 40%. The company was acquired, in its turn, by an international brewing group in 2008 (Baltika breweries corporate website).

The product portfolio of the company is wide, including more than 200 stock known units (SKUs) of versatile sorts of beer, energizers and bottled water. Despite the width of portfolio, the highest revenue (90%) is generated by classic lager beer brands, very popular and enjoyed on Russian market for more than 20 years (Baltika breweries corporate website).

The competitive situation in Russian beer market has to be characterized as oligopoly. The case company is a clear market leader with market share close to 40%, three running-up competitors hold 15-20% market share each, the rest of the market is represented by small local and niche players (Nielsen market database). All the four main competitors are owned by international brewing groups, though only the case company constitutes a significant part of group's business (Carlsberg Group corporate website). The local and niche players belong to Russian investment groups.

1.2 Business Challenge

The business challenge addressed in the Thesis is lack of understanding of competitors' reaction to the case company's price increases. Competitive reaction is important for the case company as reaction makes significant impact on performance

of the case company. According to the analysis of actual corporate performance (subchapter 3.1.4 "Analysis of secondary data"), if the competitors do not follow the case company's price increase then the latter loses market share and may lose profit.

Currently competitive reaction is considered unpredictable by the case company's management. Accepted simplistic assumption is that competitors always follow the case company's price increases. When this assumption is violated the case company loses its market share and may lose profit. Consequently, lack of understanding of competitive reaction to price increases leads to underperformance of the case company.

1.3   Objective and Output

The objective of the Thesis is to develop a tool for prediction of competitive reaction to price increase. This tool will help the case company's management to make decisions on price increase. If according to the tool the competitors are likely to follow the case company's price increase then it is safe to raise the prices. If the competitors are likely not to follow the price increase then the case company should retain from price raising.

The output of tool development is a table with significant factors and a total impact range. The table, first, enlists factors found to be significant shapers of competitive reaction and, second, assesses impact of each factor on competitive reaction. The total impact range shows an aggregated impact of significant factors on competitive reaction. If the total impact is above zero then competitors are likely to follow the case company, and vice versa. The closer total impact is to the range boundaries (minimum or maximum), the more certain is prediction.

2   Research Design

The chapter introduces steps of the research and describes in detail methods of data collection and analysis.

2.1   Steps of the Research

According to Saunders et al (2009), research design represents a plan addressing the business challenge formulated at the very beginning of research project. The design

incorporates the steps leading to elaboration of research outcomes by addressing the objective formulated upon the challenge.

The step one (chapter 1), first, formulates the business challenge and its impact on business of the case company, and, second, describes the research objective and output with relation to the challenge. Formulation of these key prerequisites guides the further proceeding of the research.

The second step (chapter 3) is the current state analysis. First, the current state analysis explores current approach to prediction of competitive reaction. Second, corporate business context, namely strategic competitive group, relevant time period and type of market competition, is analysed. Both primary data (interviews) and secondary data (actual market data) are used at this step. The current state analysis highlights importance of business challenge and points to oligopolistic theory as relevant body of knowledge.

The step of conceptual framework development (chapter 4) begins with investigation of available tools addressing the business challenge. I consider the existing tools as being not suitable for the case under consideration and opt for development of own customized tool.

In order to develop the tool I explore a body of knowledge on oligopolistic theory as pointed by the current state analysis. Exploration deductively follows from general oligopoly theory down to exploration of tacit collusion phenomenon. Tacit collusion is a market situation when competitors follow price increases of a market leader. A number of factors which make impact on competitive orientation to tacit collusion are described and discussed. For each factor its impact type is stated: if growing factor makes positive impact on competitive reaction then factor's impact type is direct, in opposite situation impact type is inverse. These tacit collusion factors and impact types are input for the next research step of proposal building.

The tool building (chapter 5) starts with adjustment of the list of factors retrieved from body of knowledge: factors with similar meaning are aggregated, not relevant factors are excluded. Next, during interviews with corporate pricing decision makers the factors are assessed as either significant or not significant for the case company, significant

factors outside the initial list are added. Significance is assessed with interviews but not with statistical analysis due to lack of sufficient historic data.

Finally, the tool for prediction of competitive reaction is being built. The aim of the tool is to assess impact of significant factors on competitive reaction.

The tool includes a table and a total impact range. The table comprises list of significant factors and each factor's impact on competitive reaction. Impact is +1 if a factor with direct impact is growing or a factor with inverse impact is decreasing. Impact is -1 if a factor with direct impact is decreasing or a factor with inverse impact is growing.

The total impact range represents overall impact of factors on competitive reaction and is calculated as a sum of each factor's impact. If sum is positive then competitors are likely to follow the case company's price increase, and vice versa.

The final research step is validation of the tool (chapter 6). First, the tool is applied to the actual market data in order to assess whether competitors are likely to respond to price increase or not. Impact for each factor is calculated based on actual factor performance using secondary data (actual market data). Second, the results of tool application are compared with actual competitive pricing behaviour, also using secondary data (actual market data). Third, business value of the tool is discussed in interviews with corporate pricing decision makers.
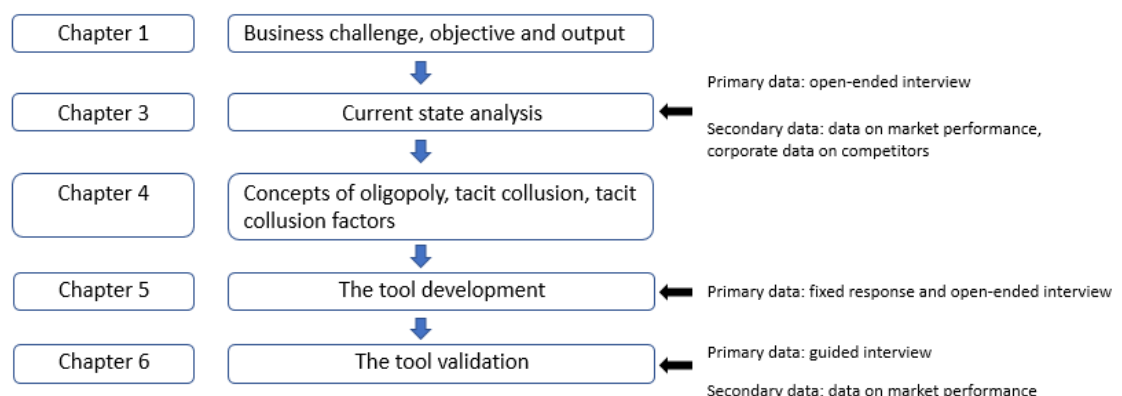
Figure 1. Research design.

The figure 1 above depicts the steps of research and points of data involvement.

2.2 Data Collection and Analysis

In this subchapter I describe the rounds of data collection and analysis implemented in this research. As visible from the figure "Research design" above, data collection and analysis supports the following research steps:

- current state analysis
- proposal building
- proposal validation

2.2.1 Current State Data Collection and Analysis

The first round of data involvement assesses importance of business challenge and clarifies current corporate approach to prediction of competitive pricing reaction. The first round uses both primary and secondary data.

2.2.1.1 Primary Data on Current State

Source of primary data is interviews during which the following questions are asked:

- why it is important to predict the competitive reaction to case company's price increase?
- what is current approach to reaction prediction?

Interview type is open-ended, ie the participants are asked specific questions and are set free to formulate the answers on their own not being constrained by the list of possible answers.

The interviewed group is represented by Chief Marketing officer (CMO), Head of Commercial Planning&Pricing (HCPP) and Head of Business Intelligence (HBI)

CMO is in charge of full spectrum of marketing activities: brand marketing, pricing, consumer research, business intelligence, commercial planning, promotions. Strategic pricing is one of its primary responsibilities.

HCPP and HBI are CMO's direct reports.

HCPP is an owner of commercial planning process which coordinates all the marketing activities initiated by corresponding departments. One more ownership is pricing process: HCPP acts as a facilitator during pricing committees and maintains pricing routine operations such as pricing benchmarking versus competitors, monitoring of execution of pricing decisions, price lists updates and so on.

HBI supports versatile marketing analytics tools and serves as point of expertise when it comes to assessing and understanding the competitors' behaviour. The main KPIs under its consideration are sales volume, sales revenue and market share. Typical question is which factors (both internal and external, ie competitive and industry-wide) are conditioning an observed KPI performance.

The research method presupposes individual interviews for each interviewed group member. This approach is implemented in order to receive unbiased and fairly weighted overall assessment of the factors and opinions. The cultural peculiarities impose the top down style of business communication, ie the opinion and attitude of supervisor to certain question significantly distorts way of thinking of the subordinates which is not acceptable for the research under consideration as each interviewed group member's point of view is equally important due to their versatile and mutually enriching expertise. Being collected and aggregated, this versatile (though definitely adjacent) expertise constitutes an exhaustive (for the current company way of working) knowledge and experience in strategic pricing.

Each interview took about 20 minutes and was registered by me in form of written notes.

Interview results represent consolidated points of view of the interviewees, significant points of disagreement are mentioned and explained.

Table 1. Parameters of interview for current state analysis.

Data Round 1	Type	Interviewees	Approach	Recording	Purpose	Data analysis
Current State analysis: why it is important to predict the competitive reaction to case company's price increase? what is current approach to reaction prediction?	Open-ended interview	CMO, HCPP, HBI	Face-to-face	20 mins each interview: notes	Assess importance of predicting competitive pricing reaction; understand current approach to predicting competitive reaction	Content analysis

The parameters of current state interview can be found summarized in Table 1 above.

2.2.1.2   Secondary Data on Current State

Analysis of secondary data on current state is implemented to support assessments of importance of business challenge made during interviews and to explore the current business context of the case company.

The secondary data sources are:

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- Nielsen market database;

- national statistics Rosstat which includes yearly data on Russian beer market sales;

- annual corporate reports of parental groups of the case company and key competitors which include data on number and geography of beer factories

Nielsen market database is a unique source of detailed data on Russian beer market performance. The data on SKU (stock known unit) sales, prices and distribution is continuously gathered from retail shops using the POS (point of sale) cash scanners and retail audits (Retail measurement). The data for Russian market is available since 2008 with a monthly time span (Nielsen market database).

The measures used in this research are monthly revenue, sales and prices on SKU level. The sales and prices are gathered directly from retail outlets, the revenue is calculated as a product of sales and price for a given SKU in a given month (Nielsen market database).

National statistics Rosstat is an official state source of macroeconomic data, including performance of markets and industries. As soon as Rosstat has long history of beer manufacturing volumes (since 1990), it is the most relevant source for analysis of beer industry trends (Rosstat).

Russian beer manufacturers are obliged to provide the data on beer manufacturing to the Rosstat according to the national legislation (Rosstat).

The data on beer manufacturing volumes used in the Thesis is provided in natural units (million litres) without additional calculations and processing (Rosstat).

Annual corporate reports of parental groups of the case company and its key competitors are accessed through respective corporate websites (AB InBev corporate website, Anadoluefes corporate website, Carlsberg Group corporate website, Heineken corporate website). These reports are precious source of data on competitors' business. Most of aspects of competitors' business represent commercial secret but some of them are disclosed in form of annual reports of parental groups as part of investors' relationship. The most relevant competititve information for the Thesis is

manufacturing capacity and share of Russian market in global business of a competitor.

The calculated measures used for the analysis of secondary data on current state are "Average price per litre", "Price parity" and "Case company Market share".

Average price per litre formula:

$$P = \frac{R}{S}$$

where P is average price per litre in Russian currency units (rubles),

R is revenue in Russian currency units (rubles),

S is sales in litres

Average price per litre is calculated for the whole beer portfolio, separately for the case company and key competitors.

Case company's Price parity formula:

$$PP = \frac{Pc}{Pco} - 1$$

where PP is price parity in %,

Pc is case company's average price,

Pco is key competitors' average price

If price parity is above 0% then case company's average price is higher than key competitors' average price. If price parity is below 0% then case company's average price is lower than key competitors' average price.

Case company's Market share formula:

$$MS = \frac{Sc}{Sco}$$

where MS is case company's market share,

Sc is case company's sales,

Sco is key competitors' sales

Time period is from January 2013 to March 2016. Relevance of 2013 as starting year of time period is conditioned by beer market performance. Since 2013 beer market sales have been falling at mostly constant pace. Choice of 2013 as starting year is grounded in subchapter 3.2.2 "Time period". Mar 2016 is a final month with full market data at the moment of execution of this research.

Measures of average price (case company and key competitors), price parity and market share are based on data from Nielsen market database and used for analysis of correlation between price parity and market share performance (subchapter 3.1.4 "Analysis of secondary data"). Correlation is analysed visually via comparison of performances of case company's average price, key competitors' average price and case company's market share. Also correlation is analysed statistically via calculation of Pearson correlation.

Strategic competitive group (subchapter 3.2.1) is analysed with two measures. First measure is competitors' market shares calculated based on Nielsen market database. Second measure is number and geography of factories of case company and key competitors taken directly from annual corporate reports.

Time period (subchapter 3.2.2) is analysed with yearly data on Russian beer market sales taken from national statistics.

Type of market competition (subchapter 3.2.3) is analysed with market shares of case company and key competitors sourced from Nielsen market database.

Table 2. Parameters of secondary data sources for current state analysis.

Data Round 1	Data under consideration	Sources	Purpose
Current state analysis	Market shares, Price parities, beer market sales, average prices, number and geography of factories	Nielsen market database, annual corporate reports, national statistics	Highlight importance of business challenge; analyse current business context

Parameters of the secondary data sources for current state analysis are summarized in Table 2 above.

2.2.2 Data Collection and Analysis for Proposal Building

The second round of data involvement has two objectives. First objective is to assess significance of factors shaping orientation to tacit collusion retrieved from body of knowledge. Second objective is to add additional significant factors which are missing on a list retrieved from body of knowledge. The second round uses primary data collected with interviews.

Below are described the parameters of interviews:

• participants are decision makers in domain of strategic pricing: Chief Marketing Officer (CMO), Head of Commercial Planning and Pricing (HCPP), Head of Business Intelligence (HBI);

• interview type is combination of fixed response (first question) and open ended (second question);

• questions are "please assess significance of each factor applied to the case company: not significant or significant" and "if needed, please offer any additional significant factors outside the list";

- interviews are executed individually for every participant in order to retrieve independent answers;

- total assessment of significance is calculated as median of individual interviewees' assessments;

- the result of interviews is a list of factors which are considered by interviewees to be significant shapers of tacit collusion in context of the case company

The factor list presented to the interviewees is based on factors and their impact type retrieved from body of knowledge on oligopoly and tacit collusion (chapter 4 "Conceptual framework development"). Factors with similar meaning are grouped, not relevant factors are excluded. Each factor is described in context of the case company.

Impact type is direct when a factor's growth acts pro-collusively or a factor's decrease acts anti-collusively. Impact type is inverse when a factor's decrease acts pro-collusively or a factor's growth acts anti-collusively.

Table 3. List of factors used during interviews for assessment of factor significance.

Factor	Description	Impact type
market concentration	sum of market shares of top 4 key competitors (strategic competitive group), %	direct
industry demand	beer industry sales, mln litres	direct
competitors' asymmetries	proportion of competitors' market shares, %	inverse
direct and indirect agreements	presence of direct or indirect agreements, for example, mutual investment projects, participation in industry unions ecc, yes or no	direct
market transparency	availability of information on market development and competitive actions, yes or no	direct

entry barriers	average number of new companies joining the competitive group per year, number	direct
interaction frequency	average timeframe for competitive reaction on competitive price setting decisions, days	direct
demand fluctuations	high season sales compared vs low season sales, %	inverse
market innovations	market share of product innovations, %	inverse
product differentiation	average price per liter for top price segment divided by average price per liter for the whole portfolio, %	inverse
multi-market contact	competitive interaction in more than one national market, yes or no	direct

The list presented to the interviewees can be found from the Table 3 above (detailed information about steps of preparation of this list can be found from subchapters 5.1 "Initial and reconsidered list of factors" and 5.2.1 "Contextual description of factors"):

Table 4. Parameters of interview for assessment of factor significance.

Data Round 2	Type	Interviewees	Approach	Recording	Purpose	Data analysis
Factors significance: • "pls assess significance of each factor: not significant, significant" • "if needed, pls offer any additional significant factors outside the list"	Mixed: fixed response, open ended	CMO, HCPP, HBI	Face-to-face	30 mins each interview: notes	Estimate the significance of the factors determining the orientation to tacit collusion: not significant or significant	Quantitatve analysis: aggregation of individual assessments using median

The parameters of the second data round are summarized in Table 4 above.

2.2.3   Data Collection and Analysis for Proposal Validation

The third round of data involvement is executed to validate the tool for prediction of competitive reaction. First, the tool is applied to actual market data in order to assess actual performance of significant factors and to get prediction whether competitors will follow the case company's price increase (first involvement of secondary data). Second, the tool's prediction is compared with actual competitive pricing behaviour (second involvement of secondary data). Third, the corporate pricing decision makers are interviewed regarding business value of the tool (primary data involvement).

2.2.3.1   First Involvement of Secondary Data for Proposal Validation

First involvement of secondary data is made to assess actual performance of significant tacit collusion factors and as a result to obtain prediction of competitive pricing reaction.

The secondary data sources are:

- Nielsen market database which includes monthly revenue, sales and prices for Russian beer industry;
- national statistics which includes yearly data on Russian beer market sales;
- annual corporate reports of case company and key competitors which include data on share of Russian market in total global EBIT (earnings before interest and tax)

These sources and their relevance is described in subchapter 2.2.1 "Current State Data Collection".

Calculated measure for some of the factors is "Factor change".

Factor change formula:

$$F_{chng} = \frac{Fe}{Fb} - 1$$

where Fchng is a change of factor value for the time period under consideration in %,

Fe is a factor value at the end of the time period,

Fb is a factor value at the beginning of the time period

Time period is from January 2013 to March 2016 (for detailed explanation please see subchapter 2.2.1.2 "Secondary Data on Current State").

Data approach to each factor can be found below.

Market concentration according to its description in the case company's context (can be found from the table 3 "List of factors used during interviews for assessment of factor significance") is measured as sum of market shares of top 4 key competitors

(strategic competitive group). It is assessed with factor change based on Nielsen market database.

Industry demand is measured as beer industry sales. It is assessed with factor change based on Nielsen market database.

Market transparency, ie availability of information on market development and competitive actions, is assessed as whether present or not. The source is Nielsen market database.

Product differentiation is measured as average price per liter for top price segment divided by average price per liter for the whole portfolio. It is assessed with factor change based on Nielsen market database.

CPI (current price index), ie accumulated price growth by the end of scope period compared to its beginning. It is assessed with factor change based on national statistics.

Presence of market leader is characterized by its market share compared to the second largest player. It is assessed with factor change based on Nielsen market database.

Importance of Russian market for international group is measured as a share of profit from Russian business in overall profit of an international group. It is assessed as whether present or not (ie important or not important). Source is annual corporate reports.

Table 5. Parameters of first involvement of secondary data for proposal validation

Data Round 3	Data under consideration	Sources	Purpose
Proposal validation	Performance of factors significant for tacit collusion	Nielsen market database, annual corporate reports, national statistics	assess actual performance of significant tacit collusion factors; obtain prediction of competitive pricing reaction

Parameters of the first involvement of secondary data for proposal validation are described in Table 5 above.

2.2.3.2 Second Involvement of Secondary Data for Proposal Validation

Second involvement of secondary data is executed to compare the tool prediction (described in previous subchapter 2.2.3.1 "First involvement of secondary data for proposal validation") with actual competitive pricing behaviour.

The secondary data source is Nielsen market database which includes monthly revenue, sales and prices for Russian beer industry.

Calculated measures are "Price parity" and "Price increase".

Price parity is already described above in subchapter 2.2.1.2 "Secondary data on current state".

Price increase formula:

$$P_{incr} = \frac{Pe}{Pb} - 1$$

where Pincr is an average price per litre increase for a year in %,

Pe is an average price per litre at the end of the year,

Pb is an average price per litre at the beginning of the year (description of measure "Average price per litre" can be found from subchapter 2.2.1.2 "Secondary data on current state").

Time period is from January 2013 to March 2016 (for detailed explanation please see subchapter 2.2.1.2 "Secondary Data on Current State").

Analysis of actual competitive pricing behaviour is done in form of two graphs. The first graph shows yearly values of price increase for case company and key competitors. The second graph depicts monthly values of case company's price parity.

Table 6. Parameters of second involvement of secondary data for proposal validation.

Data Round 3	Data under consideration	Sources	Purpose
Proposal validation	Price increases and price parities	Nielsen market database	compare the tool's prediction with actual competitive pricing behaviour

Second involvement of secondary data for proposal validation is summarized in Table 6 above.

2.2.3.3   Primary Data Involvement for Proposal Validation

The tool is also validated with interviews. The main objective of interviews is to figure out whether corporate pricing decision makers see business value from the tool.

Below are interview parameters:

- interview guide approach is implemented: the interviewees are motivated to discuss around the topic;

- the topic introduced as interview question is "do you think the results of tool application and validation with actual competitive pricing behaviour generate additional business value?"

- participants are decision makers in domain of strategic pricing: Chief Marketing Officer (CMO), Head of Commercial Planning and Pricing (HCPP), Head of Business Intelligence (HBI);

- interviews are executed individually for every participant in order to retrieve independent assessments and answers;

- interview results represent consolidated points of view of the interviewees, significant points of disagreement are mentioned and explained

Table 7. Parameters of proposal validation interview.

Data Round 3	Type	Interviewees	Approach	Recording	Purpose	Data analysis
Proposal validation: do you think the results of tool application and validation with actual competitive pricing behaviour generate additional business value?	Guided	CMO, HCPP, HBI	Face-to-face	15 mins each interview: notes	Discuss the interviewees' opinions concerning tool application results	Content analysis

The parameters of current state interview can be found in the table 7 above.

3   Current State Analysis

The focus of this chapter is on description of the current corporate approach to prediction of competitive reaction to case company's price increase. The stage of current state analysis plays an important linking role bridging the description of business challenge and further research steps of conceptual framework development and proposal building. The chapter opens with description and analysis of open-ended interviews providing information on current approach to reaction prediction. Next, secondary data analysis is applied to reinforce and complement the interview outcomes. Finally, the current business context (strategic competitive group, time period and market competition type) is described in order to support the subsequent research stages of conceptual framework development and proposal building.

3.1   Importance and Current Approach to Business Challenge

Both primary and secondary data sources are used to understand importance and current approach to business challenge of prediction of competitive reaction. Primary source is open-ended interviews with key stakeholders responsible for corporate pricing. Secondary source is represented by the data on case company's market shares and average prices of the case company and competitors.

3.1.1   Interview Questions and Results

The first interview question why it is important to predict competitive reaction to case company's price increase.

According to interviewees, the case company management understands that company sales are significantly dependent on price levels due to high beer price elasticity. Absolute price as such is not decisive but rather should be compared with competitors' prices. Price increase brings higher profit margin per litre but simultaneously may hurt sales volume. Consequently, the main question is reaction of sales volume on price increase. Significant decrease of sales volume due to price increase leads to falling profit despite higher profit margin. The most crucial point is whether the competitors will follow the case company's price increase or not. If the other main market players also

increase prices following the case company as market leader then all the players will achieve higher profits not threating beer sales due to stable price parities.

The second interview question is to describe the current approach to competitive reaction prediction.

According to interviewees, competitors' reaction is considered unpredictable. Because of the unpredictability constantly applied is simplistic assumption that competitors will follow the case company's price increase. Current approach leads to tactic reactions to competitors' moves in situations when competitors do not follow the price increases of case company.

The tactic reactions consistently violate the pricing strategy in favour of short-term gains. This way the challenge of effective management of overall price level vanishes from the strategic scope. The scope is shifting from management of average price to brand level pricing optimization based on elasticity.

Price optimization in nutshell is about finding brands with low price elasticity which react relatively moderately to price increases so that price growth outweighs sales decrease bringing additional profit. The clear drawback of this approach is ignorance of competitive reaction.

Next important prerequisite of current pricing approach also bringing significant pricing volatility is meticulous monitoring of brands' price parity versus competitive brands. This monitoring is aimed at achievement and maintaining of price parity. If competitive brands do not follow case company's price increases then price positioning can be adjusted through temporary price decreases, price increase freezes or new brand launches in affordable price segments.

At this point it was surprising to hear that CMO does not qualify the beer market as oligopoly arguing that large number of players erode this type of competition shifting it towards perfect competition. When the CMO was introduced to the objective metrics for competition type determination (Herfindahl-Hirschman index which will be discussed later in this chapter) he agreed with oligopolistic type of market competition.

3.1.2 Comments to Interviews

Summing up the outcomes of current state analysis interviews, it is important to note that despite the shared understanding of magnitude of competitive reaction it is not taken into account when making pricing decisions. The competitive reactions are claimed to be fundamentally unpredictable. For purposes of calculations of business cases for price increases the competitors are always assumed to follow case company's price moves.

Pricing strategy lies within pricing optimization based on differences in price elasticities between brands and on maintaining the price parity versus competitive. There is no such KPI as overall price level of company's brand portfolio versus competitors' brand portfolio. The challenge of finding optimal overall price level is blurred by pricing optimization on individual brands' level.

Also I would like to mention a number of interpretations of interview outcomes from inner corporate political point of view. First, the question is whether beer is a commodity product or not sensibly impacts the corporate power of marketing department. Naturally, an ability to differentiate brands and build brand equity justifying price premium and yielding additional profit constitute the main objective of the marketing function. The lower this ability is, the more questionable are resource investments into marketing budget including brand building, campaigns and staff. This political aspect clarifies a managerial focus on individual brand level management and obscuring of such KPIs as overall portfolio's price level.

The next politically driven observation is CMO's initial denial of oligopolistic character of marketing competition. The argument was that high number of market players erode the oligopoly shifting it closer to perfect competition (though no doubt that competitive balance is still far away from this perfect extremum). An inner motivator for this opinion could be an unarguable fact that profit levels in perfect competition markets are inherently lower than in oligopolistic markets. This concept could help the management to claim the counterwind impeding company performance rooted in growing number of competitors. Though being logically and emotionally straightforward, the temptation to consider the market competition type as transition from oligopoly to perfect competition provide a collateral effect of ignoring the competitor reaction which is less significant in perfect competition conditions.

Final observation in political domain is an aversion of business uncertainty. The competitor moves are obviously never predictable with 100% accuracy but the assumptions with lower than 100% likelihood are not favoured as a base for strategy. Definitely, it is politically safer to explain underperformance in terms of unpredictable competitor reactions rather than saying about wrong assumptions. The fear of making mistakes (which are clearly inevitable) leads to implicit denial to consider the domain of competitive reaction as such.

3.1.3   Analysis of Secondary Data

The analysis of importance and current approach to business challenge is contributed by analysis of secondary data on performance of case company.
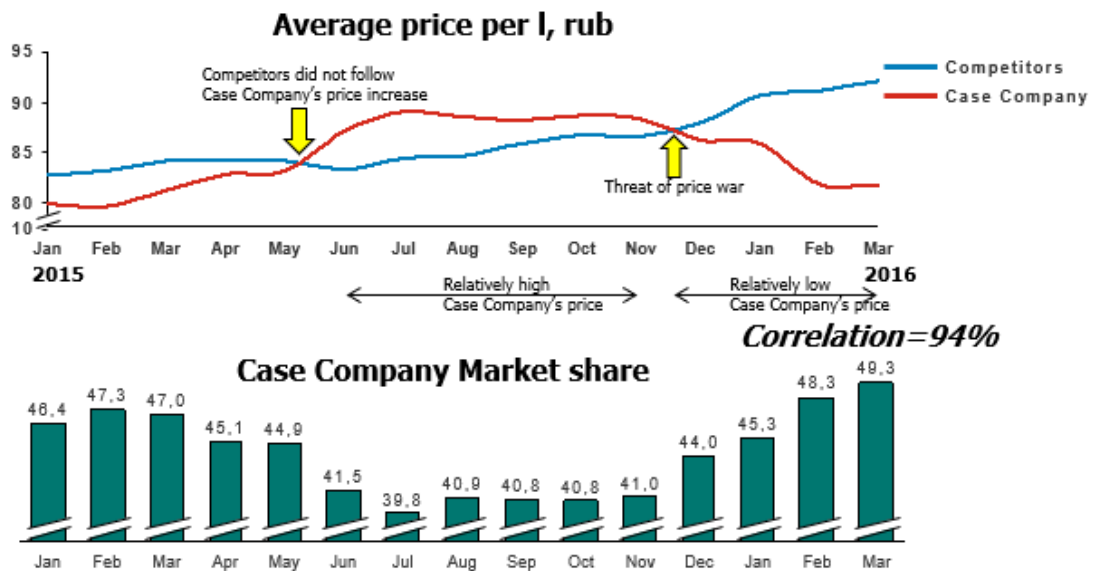
Figure 2. Correlation between price parity and market share performance.

The Figure 2 illustrates importance of business challenge highlighting the intimacy between price parity and market share performance. Price parity (upper part of the graph) consists of two series of monthly data: average prices per litre for case company and for competitors. The bottom part of the graph reflects development of market share with monthly frequency. The close relation between price parity and market share is evident both statistically and visually. Statistically, correlation between price parity and market share is as high as 94%. Visually, in June 2015 the competitors do not follow the price increase of case company. As a result, case company's average

price surpasses the competitors' price which leads to sharp drop of case company's market share.

3.2 Analysis of Current Business Context

Analysis of business context of case company contributes to further stages of the research. Clarity on competitive strategic group and time period is necessary for stage of proposal building. Understanding of type of market competition points to applicable body of existing knowledge.

3.2.1 Strategic Competitive Group

Strategic competitive group is represented by the direct competitors which are competing on similar basis (Johnson et al 2017). This notion is narrower than the industry which can include a number of competitive groups.

According to Johnson et al (2017), the grounds for strategic grouping can be classified as scope-based and resource-based. Scope-based grounds include assortment width, geographical coverage, market segments and distribution channels. Resource-based grounds concern level of resource investments in product development, marketing promotions, technological excellence and overall business size.

Clarity on strategic competitive group is important for the Thesis as lets focus the research on the most relevant data during stages of current state analysis, proposal building and proposal validation.

The approach to analysis of strategic competitive group is described in detail in subchapter 2.2.1.2 "Secondary Data on Current State", but I would like to remind it briefly below.

Number of market players and their market shares are taken from Nielsen market database (Nielsen market database).

Information on brand portfolios and manufacturing geography is taken from annual corporate reports of parental groups (AB InBev corporate website, Anadoluefes corporate website, Carlsberg Group corporate website, Heineken corporate website).

The data is taken for year 2015 as it is the latest year with full year data at the moment of research production (summer 2016).

The current market structure is characterized by high number of players (255 manufacturers deliver beer to the market) and high concentration of business (top 4 companies produce 72,5% of all volume) which is illustrated on the following Figure 3:
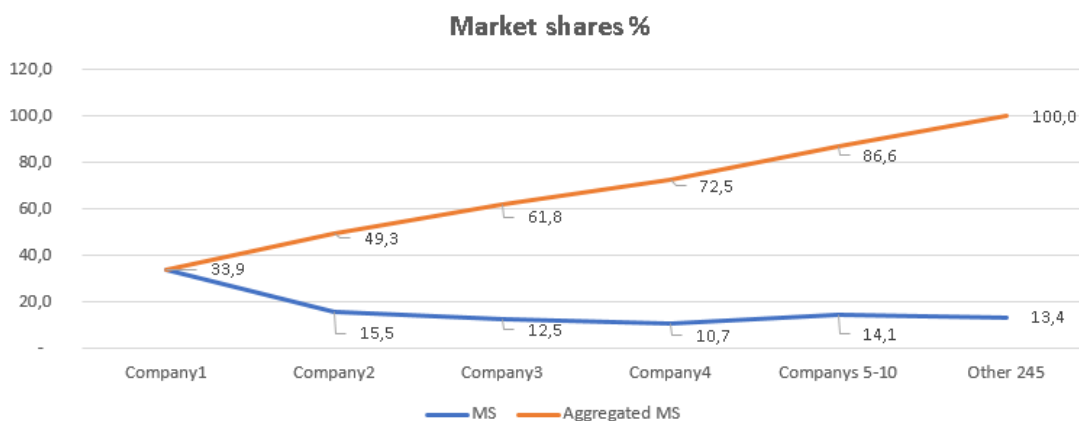
Figure 3. Industry players' market shares in 2015.

The figure reveals the high concentration of the beer market: 255 companies produce beer but just 4 of them hold 72,5% of the market. The size difference between top4 companies and the rest is drastic: while the 4th largest company produces 10,7% of product, the next six competitors ranked from 5 to 10 represent just 14,1%, the other 245 producers deliver to market 13,4%. Consequently, the top group of 4 companies pretend to be a relevant strategic competitive group due to equitable business size.

The strategic grouping of the 4 companies is justified also due to similar brand portfolio, country-wide manufacturing capabilities and ownership structure. The competitors possess identically classified brand portfolio: they offer global, national and regional brands. Global brands are usually positioned as premium offering giving an experience of internationally recognized and respected beverage; regional brands contribute to sense of local pride and address patriotic emotions; national brands are marketed between international and regional ones.

Production facilities are summarized in Table 8 below pointing to similarity of capacities and geographical coverage:

Table 8. Manufacturing geography 2015.

	Company1	Company2	Company3	Company4
# of factories	8	5	6	7
factories' geography	4 regions	2 regions	2 regions	3 regions

One more important point is ownership factor: all the 4 companies belong to the large international brewing groups which significantly amplify their capabilities (first of all, in terms of financial resources, best practice knowledge transfer, supply chain integration and brand marketing integration).

A glance at the company which is ranked as 5th contributes to understanding of apartness of the first 4 market players: its market share is 5,3% (while the smallest in strategic group is 10,7%), it has 1 factory in central region (compared to at least 5 factories in strategic group) and regional brands are dedicated only to core company's region.

3.2.2   Time Period

The main prerequisite for the chronological division of market development is its historical performance which can be found from the Figure 4 below.
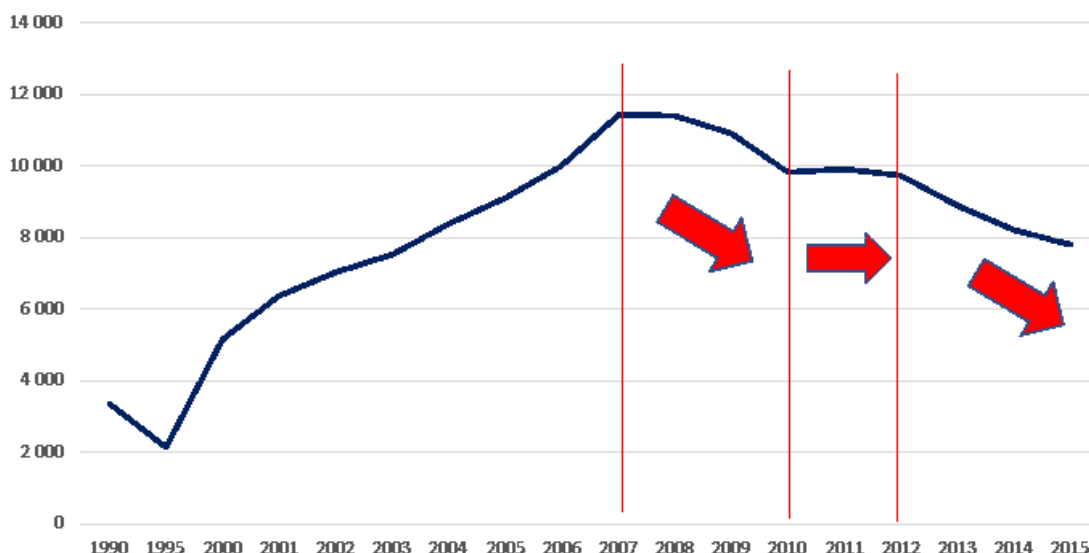
Figure 4. Russian beer market volume dynamics, million litres.

Examination of the chart clearly shows the break-even point in 2007 dividing multi-year market growth followed by the steady decline initiated by the World Financial crisis and supported mainly by the state restrictive policies and falling population disposable income. The comparisons of the compound aggregated growth rates (CAGRs) for the periods provide unambiguous implications of the new market reality which began in 2008:

- CAGR 2000 – 2007 +12,1%
- CAGR 2008 – 2015 -4,7%

Looking deeper into the recession part of the market development it is possible to figure out three stages. First fall wave in 2008 – 2010 induced by the external shock of the World Financial crisis was succeeded by the after-shock stagnation of 2011-2012. Current second wave of decline has been rolling out driven by gradually lessening disposal income of population and significant regulatory pressure on the market.

The current second wave is featured by market decrease acceleration: CAGR 2013-2015 is equal to -7,1%. Consequently, the most recent period starting from 2013 is characterized by stable negative dynamics induced by constantly acting factors and should be judged as the most relevant for the research.

3.2.3   Type of Market Competition

The useful method of understanding the marketing competition is the Herfindahl-Hirschman Index (HHI) evaluating concentration of marketing competition. HHI's calculation is fairly simplistic: the squares of market shares of every competitor are summed up, the index of 10000 signifies monopoly, index near 0 is perfect competition. Oligopoly is determined by the index value above 2000. Application of the method to the industry under consideration produces the table below. Important notice is that the calculation is done not for all the industry but rather for competitive strategic group under consideration (representing 72,5% of beer sales):

Table 9. Herfindahl-Hirschman Index 2015.

	Market share (MS) %	MS^2
Case Company	46,7	2 179,9
Competitor 1	21,3	454,7
Competitor 2	17,2	295,1
Competitor 3	14,8	219,3
Total	**100,0**	**3 149,0**

The calculation of HHI in the Table 9 above signifies that competition type within the competitive strategic group is oligopoly. According to Neubecker (2006), oligopoly is a type of competition where "competitors' actions are strongly interdependent in markets with a small number of firms, each must consider the reaction of rivals to their own decisions when choosing their short- and long-term strategies". As follows from the definition, the main feature of oligopoly is that the competitors take into account

potential reactions to each other actions. One of the main objects of such surveillance is pricing moves.

Now I would like to summarize the findings of current state analysis. During the interviews with corporate stakeholders I established importance of understanding of competitors' reaction to price increases. This understanding is important as beer sales of case company fall if average price of case company gets higher than average price of competitors. This finding made during interviews is supported by analysis of secondary data. The secondary data shows strong correlation between price parity of the case company and its market share.

Currently the case company uses simplistic approach to prediction of competitive reaction. The current approach is to expect that competitors will follow price increase. This approach leads to drop of sales volume and loss of market share if competitors do not follow the price increase.

Analysis of business context of case company brings evidence on its strategic competitive group, time period and type of market competition. Strategic competitive group is represented by the four biggest market players with diversified brand portfolio and wide geography of sales. The relevant time period begins from 2013 characterized by declining industry sales. Market competition type is oligopoly which main feature is cross-dependence of market moves, first of all, of pricing decisions.

4   Conceptual Framework Development

In this chapter I explore a body of knowledge relevant for the business challenge under consideration.

First, I describe and discuss existing tools for prediction of competitive pricing reaction. I argue that these tools are not suitable solutions for the business challenge and development of own customized tool is needed.

Second, I explore oligopolistic body of knowledge which is appropriate source of the own tool's conceptual framework according to the current state analysis. The exploration begins with general oligopolistic theory, then follows to the concept of tacit collusion and, finally, researches the factors which shape orientation to tacit collusion.

4.1 Existing Tools Addressing the Business Challenge

In this subchapter I review the existing tools which could help to predict competitive reaction to price increase. The topic of competitive reaction to price increase lies between two bodies of knowledge: prediction of competitive behavior and strategic pricing. Consequently, the existing tools to predict competitive reaction to price increase are taken from bodies of knowledge on competitive behavior and on strategic pricing. After review of the existing tools I argue why I cannot apply them to solve the business challenge and why I need to develop own customized tool.

4.1.1 Predicting Competitor's Reaction

Coyne and Horn (2009) introduce a three-step framework to foresee competitive reaction based on authors' practical consultancy experience:

- will the competitor react at all?
- what options will the competitor actively consider?
- which options will the competitor most likely choose?

According to Coyne and Horn (2009), It is important to first understand whether a competitor would react or not. The corporate managers tend to overestimate likelihood of competitive reaction, this way perceived value of managerial decision unfairly decreases.

Key considerations for the first step:

- will your rival see your actions?
- will the competitor feel threatened?
- will mounting a reaction be a priority?
- can your rival overcome organizational inertia?

Will your rival see your actions. The managerial action may not be noticed in two cases. First, the market data is not available or incomplete. Second, the impact on competitors' performance is not significant enough.

Will the competitor feel threatened. The competitor will feel threatened if one's actions create risk that the competitor's goals will not be achieved. Consequently, it is important do understand competitor's primary goals.

Will mounting a reaction be a priority. Competitor's current plans may be considered more important than answering to competitive move. If an answer to a competitive move detracts the competitor from higher prioritized activities then competitive move may be ignored.

Can your rival overcome organizational inertia. Three reasons can retain a competitor from answering a competitive move. First, a move is less likely to be answered if it incurs significant organizational changes. Second, competitive reaction is considered more difficult if it requires reassessment of managerial values and established ways of working. Third, it is harder to answer if an answer includes involvement of other parties, for example, value chain partners (Coyne and Horn 2009).

According to Coyne and Horn (2009), second important step is to assess which reaction options the competitor will consider. The authors state that usually the competitors choose the most obvious reaction. Even though the list of potential answers may be long, the most likely options are usually obvious for industry incumbents. Reaction options are greatly influenced by experience of previous reactions, especially when pricing reaction is intended.

The final step to understanding of competitive reaction, according to Coyne and Horn (2009), is to get clarity on the most likely choice from the list of reaction options. Rationally, the competitor chooses the reaction perceived as the most effective. By effective is meant a reaction maximizing benefits and minimizing costs both in short- and long-term periods.

Coyne and Horn (2009) name two key considerations at this step:

- how many moves ahead does your competitor look?
- what metrics does the competitor use?

How many moves ahead does your competitor look. Number of competitive moves and potential counter-moves taken into analysis may make significant impact on choice of

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reaction. Coyne and Horn (2009) argue that the managers opt for simplicity and most of them either do not consider competitive counter-action or consider only one iteration of reaction and counter-reaction.

What metrics does the competitor use, ie in which way the competitor determines its performance. It is important to understand whether the competitor is pursuing profit, market share or share value, either in short-term or long-term perspective (Coyne and Horn 2009).

According to Coyne and Horn (2009), the three steps of understanding the competitor reaction (will the competitor react, which options will the competitor consider, which option the competitor will choose) bring clarity on likelihood and type of competitor's reaction.

My opinion is that the clear merit of the tool offered by Coyne and Horn (2009) is practical observations as its basis. This practical ground positively differentiates the tool from other models based purely on mathematical assumptions and logics. Moreover, the structure and logic of tool is clear and ready to follow.

Nevertheless, the tool by Coyne and Horn (2009) looks for me too general to be applied to the issue of prediction of competitive reaction to price increase. As soon as the tool belongs to the body of knowledge on competitive reaction, it is not specific enough to solve purely pricing issues. The tool questions help to compare the likelihood of reaction to different competitive moves, for example, compare likelihood of competitive answer to product innovation and likelihood of answer to price increase.

At the same time, the questions are not specific enough to compare likelihood of competitive answer to price increases in different situations. For example, the questions helping to understand whether the competitor will react or not (will your rival see your actions? will the competitor feel threatened? will mounting a reaction be a priority? can your rival overcome organizational inertia?) most likely will be answered in the same way regardless of situation of price increase due to nature of price increase.

For any price increase the competitors will see the increase as market under consideration is price transparent and increases are significant. The competitors will not feel threatened as price increase by other competitor constitutes an opportunity to

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earn additional profit but not threat. Reaction would be a priority as pri cing reaction makes significant impact on corporate performance in terms of profit and market share. Organizational inertia is also likely to be constant as induced by the same processes of pricing decision making and pricing decision implementation.

4.1.2 Strategic Pricing Framework

The second tool supporting the pricing decision making with consideration of competitors is developed within body of knowledge on strategic pricing. Cannon and Morgan (1990) introduce the comprehensive framework for strategic pricing. The framework consists of a number of decision rules which point at the optimal pricing approach considering the business environment and business objectives.

The scheme of framework can be found from the Figure 5 below:
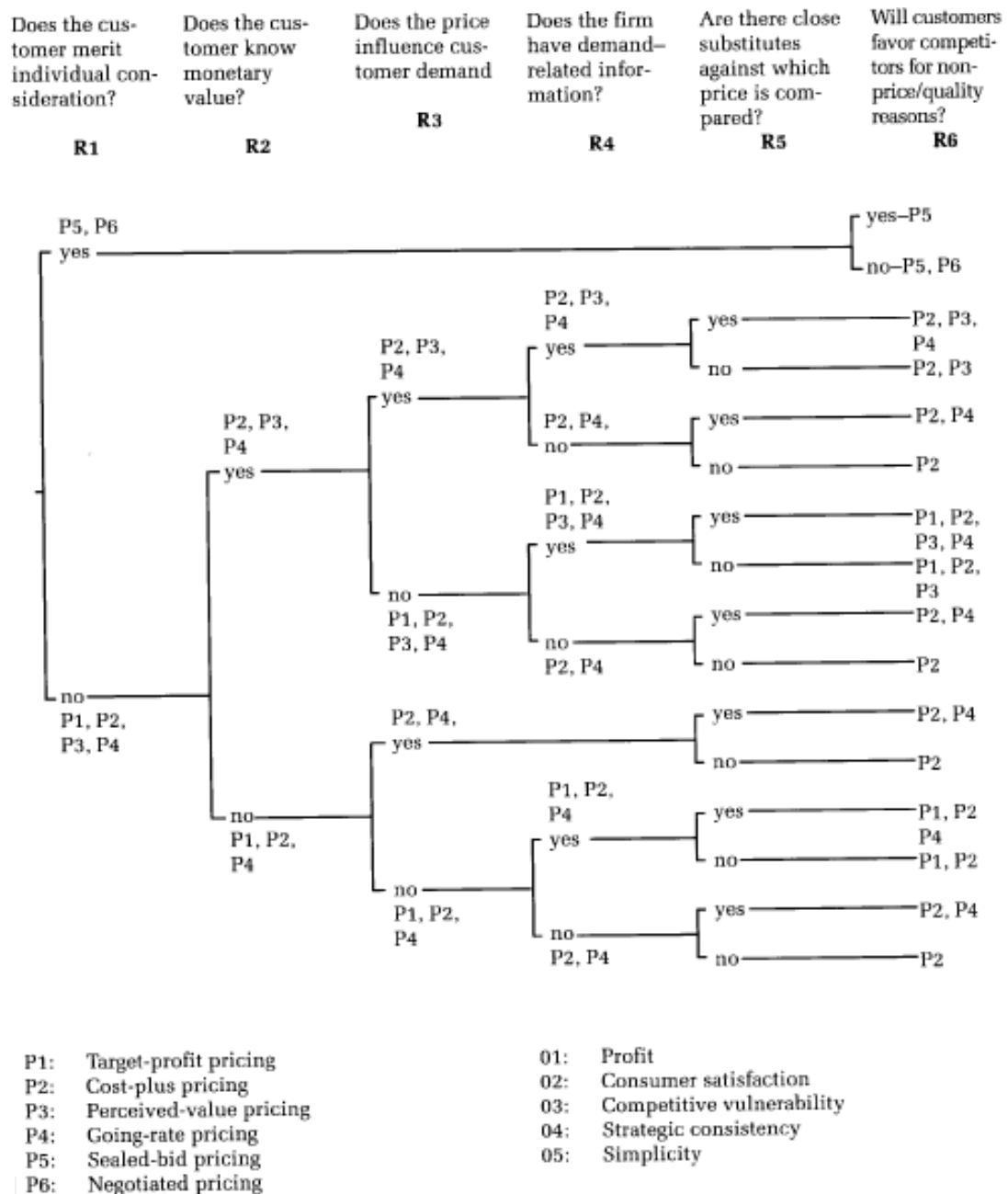
Figure 5. Strategic pricing framework (Cannon and Morgan 1990).

The framework includes five steps of decision making on the most relevant pricing strategy. The steps are formed by six environmental conditions R1-R6 at the top line of the tool. The last step leads to one or several pricing approaches marked as P1-P6 at the left bottom part of the tool. One more component of the tool is business goals, ie the goal which a firm pursues when choosing a pricing approach. The business goals are marked with numbers 01-05 at the right bottom part of the tool (Coyne and Horn 2009).

Now I can take a look at an example of tool application. Let environmental conditions look in following way:

- R1 no
- R2 no
- R3 yes
- R4 yes
- R5 yes
- R6 yes

According to the tool, the most relevant pricing approaches given these environmental conditions are P2 and P4.

Let a firm's main goal be avoidance of competitive vulnerability. In this case the firm should prioritize P4 over P2. Consequently, the P4 is the best pricing approach. According to the tool, P4 is going-rate pricing. Going-rate pricing means that the company should charge mostly the same prices as competitors do in order to maintain industry balance and provide fair return to all the industry competitors.

To my mind, the advantage of strategic pricing tool offered by Coyne and Horn (2009) is its comprehensive character and readiness to use. The tool is comprehensive as it encompasses and structures versatile approaches to strategic pricing with respect to multiple factors of business environment. The tool is ready to use as it can be easily applied thank to its step structure and consideration of firm's goals.

Nevertheless, I cannot apply the tool to solve the business challenge as the tool does not include deep elaboration of the issue of competitive reaction. The tool simplistically recommends to price as competitors do but does not help to address the question behind the business challenge: will competitors follow the case company's price increase? According to the tool, the competitors will follow the price increase in order to keep the industry balance, but this research's business challenge shows that the competitors do not always follow.

4.2   Oligopolistic Theory

In previous subchapter I have reviewed and discussed the existing tools addressing the business challenge. I have argued that these tools are not applicable for the business case under consideration. Consequently, development of own customized tool is needed.

As soon as the case company is an oligopoly (which is proved in subchapter 3.2.3 "Type of market competition"), it is reasonable to begin building the conceptual framework from exploration of the general oligopolistic theory. The theory is a starting point leading to more specific concepts. This starting point helps to understand the context and market principles in which operates the case company.

According to Townsend (2002), the most important characteristic of oligopolistic market is interdependence of decisions, ie market players make their own moves considering potential competitive counter-moves. History of economic science has imprinted a number of attempts to elaborate a theory for oligopolistic market and its players behaviour, among the most generally accepted are concepts of Cournot, Bertrand and Edgeworth.

Chronically first is the Cournot's oligopoly theory. The first prerequisite of the theory is interaction of only two competitors (duopoly) is under consideration. The second prerequisite is that competitors' costs are equal and do not depend on production volume. The third prerequisite is homogeneity of product (Townsend 2002).

The first implication of the Cournot's s oligopoly theory is that collusion leads to monopoly-type profit maximization at point where marginal revenue from production volume is equal to marginal cost, and profit split into each competitor's account would be a matter of agreement. The second implication is absence of reciprocal consideration of potential competitive moves signifies a pure competition-type market where each player is aiming to produce at point where average price is equal to average cost. The third implication is that each duopolist regards competitor's production volume as fixed and deals with the residual market demand. Eventually, both competitors satisfy equal amount of residual demand at the point where residual marginal revenue is equal to marginal cost, thus combined output is above the monopoly but below the pure competition. The precious finding from this third option is

that the sequentially achieved balance of competitors' production outputs is stable as there is no motivation for the market players to change the situation. This is a well-known Nash equilibrium named after the great games theory scientist (Townsend 2002).

Townsend (2002) argues that Bertrant oligopoly theory shares the logic with Cournot's one except for one important prerequisite. In Bertrant theory, the oligopolists while deciding on its production assume that competitor fixes the price and not volume as in Cournot concept. Given this prerequisite the oligopolistic equilibrium proves to be unstable as consequent competitive attempts to increase market share by lowering the price leads to pure competition.

Edgeworth concept has as cornerstone a fairly realistic assumption that duopolists have limited capacity and no one is able to satisfy market demand alone. This prerequisite introduces a dynamic price aspect into the oligopolistic theory: price decreases compared to the monopolist level as far as market players are expanding their output. At some point the players reach the capacity limitations and facing the residual demand are able to make decision to lift the prices (Townsend 2002).

Suarez-Villa (2016) states that oligopolization of markets is wide spread nowadays. The trend of economic power concentration has been in place since early 1980s conquering developed and partially developing economy countries. The oligopolization trend has been largely fuelled by 3 factors: vigorous merger and acquisition deals, loosening of state control in form of industries deregulation and mild antitrust policies, and sharp growth of financial capital accelerating mergers and acquisitions. The figures below depict a degree of oligopolistic pervasion within versatile industries (US national market):

- Computers and accessories retail commerce: share of top4 companies 26% in 1992 and 75% in 2007;
- General merchandise retail stores: share of top4 companies less than 50% in 1992 and 73% in 2007;
- Retail banking: contraction of number of banks from 20 in 1982 to 4 in 2009;
- Investment banking: total assets versus US GDP for top 6 banks 17% in 1995 and 64% in 2010;

- Hospitals: top players control two-thirds of the market nowadays having gone up from one-quarter in late 1970s;

- Telecommunications: monopoly AT&T was broken into seven independent regional companies in 1984 but 4 of them has been consolidated back by 2006

The feature of such markets is avoidance of price competition among the competitors. The price leader is tacitly evidentiated and delegated to establish prices maximizing the profits of the market players. This type of competitive coordination is called tacit collusion (Suarez-Villa 2016).

Below I would like to summarize the key implications from exploration of general oligopolistic theory:

- key definition of oligopoly is embedment of competitors' potential moves into its own market strategy;

- oligopolistic competition is widely spread nowadays and has seen impressive growth during recent decades;

- the competitors have tendency to limit competition by means of tacit collusion on pricing decisions

4.3   Tacit Collusion

This stage of conception framework development concentrates on oligopolistic players' tendency to tacitly agree on prices and retain from price competition. The concept of tacit collusion was uncovered during previous stage of exploration of general oligopolistic theory. In its turn, exploration of phenomenon of tacit collusion leads to the final stage which researches the factors shaping orientation to tacit collusion.

According to Neubecker (2006), the collusion phenomenon has game theoretic prerequisites. Competition game with one or any finite number of rounds locks the players into the Prisoner dilemma where the mutual profit of the players is below the potentially achievable amount due to threat of aggressive competitive actions. The game outcomes drastically change if the players' interaction is (or at least is considered by the players) as infinite (so called "supergames"): iterative and multi-round interaction lessens the incentives for individual profit maximization, thus leading to extra-profitable collusion.

The Figure 6 below illustrates the dynamic equilibrium with optimum moving to mutually winning position driven by iterative multiple contacts.
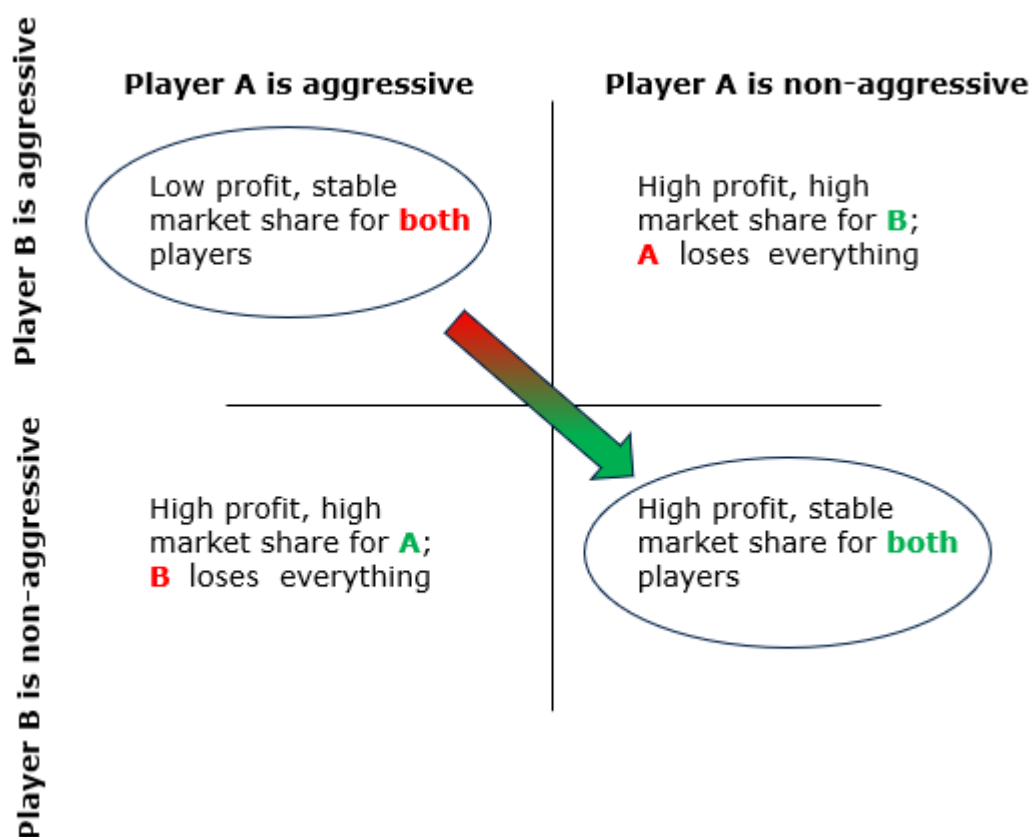
Figure 6. Market strategic application of Prisonner's dilemma.

Neubecker (2006) argues that the supergame model has been found highly applicable to understanding behaviour of oligopolists as most of the markets satisfy the condition of infinite (or assumed as infinite) interaction. Despite being lucrative for the players, the explicit collusion is prohibited and sewed by competitive laws in most of the countries as "cartelization" of an industry leads to benefits' redistribution in favor of the players and at expense of customers and other members of industry network (suppliers, buyers ecc). The most frequent final result of cartelization is a reduction of total economic benefit. Meanwhile tacit collusion, ie collusion without explicit agreements on prices, volumes and other substantial business characteristics, can provide comparable extra-profits to market players being legally unenforceable because of absence of formal agreements. The absence of formal agreement is substituted by self-reinforcing mechanism in form of ability to detect deviation from

collusion and to punish such deviation, first of all, by lowering market prices and switching the competition into the mutually suboptimal Prisonner's position.

Besides providing theoretical justification and mechanism explanation for tacit collusion, Neubecker (2006) also cites some sources of empirical evidence on that. Obviously, as soon as according to its definition the tacit collusion is quite tricky to observe, describe and analyse, the large body of empirical evidence is presented by legal cases against the explicit cartel agreements. Vast description of 989 cases gone through the U.S. Department of Justice and the Federal Trade Commission between 1890 and 1969 can be summarized as the following list:

- most of cartelization cases had place in already highly concentrated industries;
- agreements featured long-term duration and covered large respective industries' shares;
- nearly all the cases involved participation of 10 and less market players;
- most of the cartels were set up of the most important market players

The next empirical source provided by Neubecker (2006) is a study of more than 40 international explicit agreements on collusion investigated by U.S. Department of Justice and the European Commission. The most significant findings are:

- the players mostly agreed on prices and market shares, more rarely on regional division of the markets;
- collusion time spans heavily varied from 1 to over than 20 years;
- agreements involved some major industry players and affected global business worth of 30 billion dollars

Marshal et al (2012) provide the delineation of explicit versus tacit collusion. The delineation is put by the authors in the following way: though being strategically similar and yielding the same results and strategic positions, the explicit collusion is a more powerful instrument of competitive coordination as it does not require the self-enforcement by means of repetitive threat of competitive retaliation which is substituted by legal documents. The legal documents constitute the main matter of antitrust accusations and the most evident trace of malicious activities in field of explicit collusion.

Chevalier-Roignant et al (2011) add to the exploration of tacit collusion a consideration that "for infinitely repeated games, many strategy profiles, including the tacit collusion profile, that are not optimal from a short-run, static perspective can sustain as a perfect industry equilibrium provided that players are sufficiently patient or discount factors are large (discount rates are low)".

Feuerstein (2005) agrees with Chevalier-Roignant et al and argues that crucial key to emergence of agreement is patience sufficient to disregard current profits in favor of future one which is supported by punishment of deviation (threat that a deviating firm would lose more profit in long-tern than grabs due to short-term cheating).

Summarizing the exploration of tacit collusion phenomenon, I would like to highlight the following points:

- short-term interaction of competitors lead to mutually disadvantageous results;
- long-term interaction may lead to achievement and keeping of mutually profitable market equilibrium (collusion);
- while explicit collusion is illegal, tacit collusion is legal but requires self-reinforcement. Self-reinforcement have two forms: additional profit from collusion and loss of profit in case of collusion break;
- a number of factors shape orientation to tacit collusion

4.4 Tacit Collusion Factors

Exploration of body of knowledge on factors which shape orientation to collusion is the last stage of conceptual framework development. The developed conceptual framework is a prerequisite for subsequent research step of building the proposal which solves the business challenge. Below I explore three points of view on which factors shape tacit collusion.

4.4.1 Grimm et al's Factors Affecting Intensity of Rivalry

Grimm et al (2005) highlight several factors which affect intensity of rivalry, this way determining collusion:

- number of competitors;

- industry demand;
- homogeneity of firms;
- multimarket contact

Additional factors linked to the above ones are:

- direct and indirect agreements;
- capacity utilization;
- product standardization

Small number of competitors simplifies coordination of pricing strategies. The higher number of competitors in market, the more fierce competition is. Even if all the players are willing to collude, it is more difficult to tacitly agree on market price level because of versatile optimal price levels among competitors (Grimm et al 2005).

Grimm et al (2005) also provide examples supporting their views. The first example is the lead antiknock compound market which demonstrated collusive pricing behavior from 1964 to late 1970s. There were only 4 market players, two of them dominated. The second example is the US airline industry. The industry rivalry was measured for a number of years as average yearly number of competitive actions and reactions. The research showed that there was significant direct relationship between number of firms and rivalry: the higher number of competitors, the higher is rivalry, and vice-verse. The third example is study of such industries as brewing, long-distance telecommunications and personal computers from 1975 to 1990 which also demonstrated the direct relationship between number of firms and rivalry.

Grimm et al (2005) add that industries with high number of competitors still may achieve tacit collusion. The prerequisite is presence of direct or indirect agreements. Direct agreements can stipulate actions of two or several competitors in fields of marketing, research and training. As direct agreements are also classified versatile forms of cross-ownership. Indirect agreements are memberships in trade associations and applicable industry standards.

As an example of coordination and collusion within an industry with high number of players Grimm et al (2005) refer to the US off-road vehicle aftermarket. The urgency to

have industry standards for higher safety led to establishment of an industry association and release of industry standards and standard price lists.

The second factor offered by Grimm et al (2005) is industry demand. Generally, growing demand favors collusion as soon as each competitor is able to grow sales and profit without damage to competitor's business. Opposite is true for falling demand which undermines collusion.

Level of capacity utilization is closely linked to the demand development. Full capacity impedes sales growth through price decrease, so the competitors producing at or near full capacity are more willing to maintain collusion. The opposite is true for idle capacity: the potential to rapidly increase output and sales through price decrease is damaging for tacit pricing collusion (Grimm et al 2005).

Grimm et al (2005) illustrate the factor of industry demand with an airline industry. When demand is below capacity, an airline faces the issue of empty seats. As soon as marginal cost of filling an empty seat is low and fixed cost to be covered is high, the airlines are interested in selling as many empty seats as possible. The outcome of this incentive is intensive rivalry and low average prices.

The third factor proposed by Grimm et al (2005) is homogeneity of firms. Competitors which are featured by similar cost structures, business sizes, product standardization can achieve collusion more easily than heterogeneous competitors. Especially important is product standardization. Lack of product standardization can be illustrated as presence of two versatile versions of product in the market. One version is high-end, ie incurs high costs to produce and is sold for high price. The other version is low-end, ie is cheap to produce and is priced moderately. Clearly, it is more difficult to reach pricing collusion in situation with heterogeneous rather than homogenous product.

Grimm et al (2005) refer to the example of US computer software industry in order to show the role of the factor of firm's homogeneity. The rivalry grows in US computer software industry in line with increasing heterogeneity of product and cost structures.

The fourth factor offered by Grimm et al (2005) is multimarket contact. Firms which interact in multiple markets are more likely to collude than firms which interact only in one market. The incentives for aggressive competition are weaker for firms competing

in several markets as soon as an aggressive behavior in one market can be punished by competitive reaction in multiple markets. This way the risk of retaliation may overweigh the benefit of aggressive behavior.

4.4.2 Venkataraman et al's Factors that Shape Competitor Responses

Venkataraman et al (1997) point out the following factors shaping competitive reaction:

- action nature (price or non-price)
- size of the rival
- visibility of the action
- complexity of the action

According to Venkataraman et al (1997), the first factor is an action nature. Price actions are much more likely to be responded than non-price actions as they incur clear and direct impact on sales and profit of actor and competitors, action and reaction are easy and fast to execute, price visibility is usually high.

The second factor introduced by Venkataraman et al (1997) is size of a rival. Large competitor is more likely to respond as usually it possesses more resources to adapt to the change. By resources the authors mean versatile set of assets such as human capital, finance, stable relations with partners within value chain, facility and so on.

The third factor offered by Venkataraman et al (1997) is visibility. Actions with high visibility are more likely to be responded than actions with low visibility. By visibility is meant easiness of direct and immediate observation of an action.

By complexity of action Venkataraman et al (1997) intend type of reaction provoked by an action. If reaction can be made within standard practices and processes of responding competitor, then the action is not complex, and vice-versa. Clearly, non-complex actions are more likely to be responded.

Venkataraman et al (1997) elaborated the list of the factors upon the large-scale study of actions and reactions in airline industry. Under consideration were more than 800 actions and more than 200 competitive reactions. The empirical data was statistically

analyzed in order to estimate probabilities of reactions to versatile actions and can be found from the Table 10 below:

Table 10. Results of Venkataraman et al's study of airline industry (Venkataraman et al 1997).

Probability of Responding to	Rival Is Major Carrier	Rival Is National Carrier
Any Action	.20	.037
Price Actions	.24	.034
Nonprice Actions	.17	.039
High-Visibility Actions	.23	.04
Low-Visibility Actions	.16	.03
High-Complexity Actions	.12	.02
Low-Complexity Actions	.23	.04

According to Venkataraman et al (1997), this analysis supports that probability of reaction differs due to action nature (price/non-price), visibility of the action, complexity of the action and size of a rival.

4.4.3 Ivaldi et al's Relevant Factors for Collusion

Ivaldi et al (2003) consider the following factors to be relevant for tacit collusion:

- number of competitors
- entry barriers
- interaction frequency
- market transparency
- industry demand
- demand fluctuations
- market innovations
- cost structure asymmetries
- capacity asymmetries
- product differentiation
- multi-market contact

The higher number of competitors is, the more difficult is to achieve collusion. The first reason is essential impediments for tacit coordination, especially if competitors have different optimal average prices and business sizes. The second reason is smaller individual share of industry profit pie in case of higher number of competitors, as a

result, collusive gain is modest. Moreover, deviation from collusion would let to steal profit from numerous competitors, this way bringing significant profit (Ivaldi et al 2003).

The entry barriers help to sustain collusion. Absence of barriers makes impossible to keep elevated profit margin levels within collusion, this way breaking the incentive to collude. Moreover, scope for retaliation in case of deviation decreases due to potential new entries into the colluding industry. The higher likelihood of new entry is, the more competitors are tempted to cut prices and maximize short-term profit, this way breaking collusion (Ivaldi et al 2003).

The frequent interaction between colluding firms acts pro-collusively. Frequent interaction leads to faster reactions aimed at punishing deviation. This way threat of punishment grows which, in its turn, favors collusion. It is simple to imagine the opposite case when firms interact only once. In this case there are no incentive to collude, and competitors try to maximize short-term profit. Consequently, the further competitors are from single interaction, ie the more frequently the competitors interact, the higher is incentive to collude. What matters most is not number of interactions as such, but rather possibility to rapidly adjust prices in reaction to competitive actions. This flexibility to adjust prices constitutes punishment for collusion deviator, this way supporting collusion (Ivaldi et al 2003).

In order to illustrate the relevance of the factor of interaction frequency, Ivaldi et al (2003) refer to practice of US government. US government prefers to buy vaccines in large amounts and less frequently which diminishes potential for collusion among the bidders.

The market transparency is one more factor which acts pro-collusively, according to Ivaldi et al (2003). Transparency constitutes a vital prerequisite for collusion. Definitely, in order to punish a price cutting deviator competitors first should detect this price cutting. If price dynamics is not observable from available market data then punishments for deviation is not possible and collusion is hard to be achieved.

Ivaldi et al (2003) underline that degree of transparency may vary depending on market conditions. For example, if market is stable then price deviations are better visible even with partial market information. Opposite is true for the unstable market: more information is needed to detect competitive deviation. Additional important

characteristics of market transparency are publication delay and level of aggregation. The longer is delay, the less efficient the punishment is which undermines collusion. The higher level of aggregation, the less transparent are competitors' pricing moves which weakens threat of punishment and consequently collusion.

The factor of industry demand makes direct impact on collusion. Growing demand favors collusion, falling demand hinders it. The reason is amount of future profits which receive the colluding firm at expense of short-term profit. Growing demand increases future profits, this way augmenting incentive to collude. Contrarily, falling demand devaluates future profits motivating to break collusion and grab short-term profit. Clearly, the sharp market contraction makes collusion nearly impossible (Ivaldi et al 2003).

Ivaldi et al (2003) also provide comments on a number of evidences, for example case courts, showing that market growth hinders collusion. The authors explain this counter-logical effect with impact from the factors adjacent to market growth. For example, the growing industry with low entry barriers may attract new entrants. In its turn, the factor of new entrants, as discussed above, works anti-collusively.

The next factor considered by Ivaldi et al (2003) is demand fluctuations. By demand fluctuation is meant a demand shock independent from firms within industry. The demand shock is formulated as significant change of demand which is unpredictable in terms of time and direction (positive or negative). The authors state that possibility of demand shocks in industry aggravates achievement of collusion. This statement is explained by changing amounts of profit and punishment degree. In case of positive demand shock the short-term profit from deviation essentially grows. Nevertheless, punishment happens with some time lag at the next point of time where the effect of positive demand shock is likely to be over. Consequently, amount of punishment which happens in post-boom period is likely to be lower than short-term profit from the boom period. Growing short-term profit and diminishing punishment altogether hinder the collusion.

The market innovations is another factor considered by Ivaldi et al (2003) to be significant for tacit collusion. Market innovations impede collusion. The more innovative is the market, the weaker is orientation to collusion. The reason is competitive advantage achievable by a successful innovator. The presence of competitive

advantage, ultimately expressed as additional profit, diminishes relative value of additional profit brought by collusion. Decrease of collusion value for a successful innovator leads to decrease of motivation to collude. In similar way suffers ability to punish a collusion deviator. The profit loss due to collusion break is less significant for a successful innovator than for the other competitors. In addition to lowering collusion value, efficiency of punishment also drops which all contribute to weakening orientation to collusion. Additional innovation effect on collusion break may come from temporary character of competitive advantage based on innovation. Usually the competitors learn to copy or overcome an innovation, this is why elevated profit brought by innovation is temporary. Consequently, an innovator may be interested to maximize its profit while innovation benefits are still lasting. This way an innovator is motivated to maximize short-term profit breaking collusion. The authors state that innovations are detrimental for collusion regardless of whether they come from market incumbents or new entrants.

The next factor introduced by Ivaldi et al (2003) is asymmetry of cost structures. The authors argue that asymmetric cost structure hurts collusion. By asymmetric cost structure is meant that competitors have different cost structures. Asymmetric cost structure impedes collusion in several ways. First, asymmetric competitors have different profit margin levels at any given price, consequently it is more difficult for them to tacitly find the market one price acceptable for each competitor.

Second, a competitor with lower cost structure has incentives to break collusion even if mutually acceptable price point is found. This statement can be explained with cost asymmetry effects on profit from collusion break and on efficiency of punishment threat. Clearly, profit from collusion break is higher for the low cost competitor as additional sales come with profit margin level higher than competitors' level. Consequently, the low cost competitor has incentive to break collusion as the break will bring elevated profit. Punishment is less severe for a low cost competitor. When competitors with higher cost structure decrease their prices down to the minimum level, ie to the level of zero profit, the low cost competitor still receives some profit due to higher level of profit margin. Consequently, both additional profit from collusion break and less severe punishment motivate a competitor with low cost structure not to collude but rather to be aggressive to rivals (Ivaldi et al 2003).

One more collusion factor discussed by Ivaldi et al (2003) is asymmetry in capacity constraints. By asymmetry in capacity constraints is intended a situation when

competitors have different production capacities. The more asymmetric capacity constraints are, the less is likelihood of tacit collusion. This dependency is explained by relatively high additional profit from collusion break for a firm with high share of idle capacity and moderate punishment for the collusion break. An idle capacity firm gets higher additional profit from collusion break compared to firms with low idle capacity. This is due to ability of an idle capacity firm to rapidly increase its sales. Punishment by firms with low idle capacity is not efficient as these firms cannot increase its production and sales in order to push a deviator out of the market.

The product differentiation, according to Ivaldi et al (2003), also significantly shapes the market orientation to tacit collusion. Product differentiation means that a product offered by competitors varies by its perceived quality and price. The higher product differentiation is, the weaker is incentive to collude for a high quality high price competitor. The weak motivation to collude can be explained with relatively high additional profit which earns a high quality deviator and with reduced punishment threat it faces. The high quality high price firm receives higher additional profit from collusion break compared to analogous profit of low quality players. The reason is higher profit margin coming from additional sales. The punishment threat is substantially hindered as the minimum price level set by the revengers, ie the price level bringing zero profit, leaves some profit for the high quality competitor due to higher profit margin.

Ivaldi et al (2003) also mention one more way how differentiated product may hinder collusion in non-transparent market. By non-transparent market is meant a market where information on sales and prices for each competitor is not available. In non-transparent markets a firm may reason about competitive actions based on a firm's own performance. For example, if sales are falling at stable prices then likely competitors have reduced their prices. Naturally, this way of reasoning about competitive actions is significantly sophisticated and distorted when product is differentiated. For example, the sales may be falling not due to competitive price reduction but due to rising quality of competitive product. This way lack of market transparency amplified by product differentiation reduces likelihood of collusion.

The last but not least tacit collusion factor discussed by Ivaldi et al (2003) is multi-market contact. According to the authors, orientation to collusion grows in line with a number of markets where competitors interact. The first reason is that number of interactions essentially increases when several markets are involved. Increased

number of interactions leads to faster discovery of mutually acceptable market price and to faster punishment in case of collusion break. The second reason is softening of asymmetries between competitors. For example, one competitor may have lower cost structure on the first market and the other competitor may have lower cost structure on the second market. In this case the incentive to break collusion on the first market is mitigated by analogous threat on the second market. Overall, this multi-market mitigation of asymmetries contributes to tacit collusion. The third reason is aggregated amount of additional profit from collusion and punishment for collusion break. The amount of additional profit and punishment gravity at one market may not be enough to sustain collusion, but aggregated amount and punishment from several markets may constitute significant motivator acting in favor of collusion.

To summarize, I would like to point out that in this subchapter I have explored existing body of knowledge on factors which shape orientation to tacit collusion. I have described the factors offered by different authors and depicted factors' impact on tacit collusion. The described factors and their impact serves as input for the next stage of research dedicated to the proposal building.

5   Proposal Building

In this chapter I build an own tool for prediction of competitive reaction to price increase. The chapter utilizes the findings of previous research stage of conceptual framework development, primarily knowledge on factors shaping orientation to tacit collusion. First, the list of factors shaping tacit collusion is discussed in interviews with corporate stakeholders and significance of each factor's impact on collusion orientation is assessed. Second, the significant factors are presented in form of a table and the total impact of factors on collusion is calculated. The table and the total impact together form a tool for prediction of competitive reaction to price increase.

5.1   Initial and Reconsidered List of Factors

The building of customized tool for prediction of competitive reaction begins with reconsideration of the initial list of factors explored at stage of conceptual framework development. The aim of reconsideration is to combine the factors with similar meaning and to exclude not relevant factors.

The initial list of factors explored at stage of conceptual framework development can be found from the Table 11 below.

The first column "Factor" is a factor name formulated by authors.

The second column "Impact" characterizes a direction of a factor's impact on orientation to tacit collusion according to authors' description:

- growing factor with direct impact acts pro-collusively;
- growing factor with inverse impact acts anti-collusively;
- decreasing factor with direct impact acts anti-collusively;
- decreasing factor with inverse impact acts pro-collusively

The third column "Source" relates to the authors who described a factor.

Table 11. Initial list of factors shaping orientation to tacit collusion.

Factor	Impact	Source
1 number of competitors	inverse	Grimm et al 2005
2 industry demand	direct	Grimm et al 2005
3 homogeneity of firms	direct	Grimm et al 2005
4 multi-market contact	direct	Grimm et al 2005
5 direct and indirect agreements	direct	Grimm et al 2005
6 capacity utilization	direct	Grimm et al 2005
7 product standardization	direct	Grimm et al 2005
8 price nature of action	direct	Venkataraman et al 1997
9 size of the rival	direct	Venkataraman et al 1997
10 visibility of the action	direct	Venkataraman et al 1997

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11 complexity of the action	inverse	Venkataraman et al 1997
12 number of competitors	inverse	Ivaldi et al 2003
13 entry barriers	direct	Ivaldi et al 2003
14 interaction frequency	direct	Ivaldi et al 2003
15 market transparency	direct	Ivaldi et al 2003
16 industry demand	direct	Ivaldi et al 2003
17 demand fluctuations	inverse	Ivaldi et al 2003
18 market innovations	inverse	Ivaldi et al 2003
19 cost structure asymmetries	inverse	Ivaldi et al 2003
20 capacity asymmetries	inverse	Ivaldi et al 2003
21 product differentiation	inverse	Ivaldi et al 2003
22 multi-market contact	direct	Ivaldi et al 2003

As said before, reconsideration of the list of factors intends combining factors with similar meaning and excluding not relevant factors.

The first group of factors to be combined is "1 number of competitors" by Grimm et al (2005), "9 size of the rival" by Venkataraman et al (1997) and "12 number of competitors" by Ivaldi et al (2003). All these factors represent an idea that the more concentrated the market is (ie small number of competitors hold large market share), the stronger is orientation to collusion. Consequently, these factors can be grouped under "market concentration".

The second group of factors to be combined is "3 homogeneity of firms" by Grimm et al (2005), "19 cost structure asymmetries" and "20 capacity asymmetries" by Ivaldi et al (2003). These factors deal with different aspects of similarity of competitors and can be

grouped as "competitors' asymmetries". According to these factors, the more asymmetric competitors are, the weaker is orientation to collusion.

The third group of factors to be combined is "2 industry demand", "6 capacity utilization" by Grimm et al (2005) and "16 industry demand" by Ivaldi et al (2003). Close relationship between industry demand and capacity utilization are explored above during discussion of these factors. These three factors can be grouped under "industry demand".

The fourth group of factors is "visibility of the action" by Venkataraman et al (1997) and "market transparency" by Ivaldi et al (2003). Both factors intend that the more competitive actions are visible by the other competitors and the faster these actions are visible, the higher is orientation to tacit collusion. The factors can be grouped as "market transparency".

The fifth group of factors to be combined based on identity is "4 multi-market contact" by Grimm et al (2005) and "22 multi-market contact" by Ivaldi et al (2003).

The sixth group of factors to be combined also due to identity is "7 product standardization" by Grimm et al (2005) and "21 product differentiation" by Ivaldi et al (2003).

Now I would like to exclude from the list the factors which are not relevant for the tool. First factor to be excluded is "8 price nature of action" by Venkataraman et al (1997). As soon as the tool serves purely for pricing actions, specifically for price increase, this factor will be constant for all the applications. Consequently, this factor does not help to classify market orientation as pro- or anti-collusive and should be excluded.

Second factor to be excluded is "11 complexity of the action" by Venkataraman et al (1997). The rationale for exclusion is similar to the previous factor of price nature of action. Complexity of the action also do not variate from one market situation to another as different price actions have nearly identical complexity. For example, the processes of decision making and execution of decision to raise prices by x % are significantly identical despite whether the industry is growing or falling.

Table 12. Reconsidered list of factors shaping orientation to tacit collusion.

Factor	Impact	Source
market concentration	direct	Grimm et al 2005, Venkataraman et al 1997, Ivaldi et al 2003
industry demand	direct	Grimm et al 2005, Ivaldi et al 2003
competitors' asymmetries	inverse	Grimm et al 2005, Ivaldi et al 2003
direct and indirect agreements	direct	Grimm et al 2005
market transparency	direct	Venkataraman et al 1997, Ivaldi et al 2003
entry barriers	direct	Ivaldi et al 2003
interaction frequency	direct	Ivaldi et al 2003
demand fluctuations	inverse	Ivaldi et al 2003
market innovations	inverse	Ivaldi et al 2003
product differentiation	inverse	Ivaldi et al 2003
multi-market contact	direct	Ivaldi et al 2003

The reconsidered list of the factors shaping orientation to tacit collusion is summarized in the Table 12 above.

5.2 Significance of Factors

Significance of factors is assessed during interviews with employees responsible for pricing decision making. This subchapter begins with description of factors in context of the case company. Next, interview results are presented and commented.

5.2.1   Contextual Description of Factors

Customization of the reconsidered list of factors begins with description of factors in context of the case company. Customized description of factors clarifies applicability of factors to the case company and makes them measurable. The descriptions can be found below:

- market concentration: sum of market shares of top 4 key competitors (strategic competitive group), %;
- industry demand: beer industry sales, mln litres;
- competitors' asymmetries: proportion of competitors' market shares, %;
- direct and indirect agreements: presence of direct or indirect agreements, for example, mutual investment projects, participation in industry unions ecc, yes or no
- market transparency: availability of information on market development and competitive actions, yes or no;
- entry barriers: average number of new companies joining the competitive group per year, number;
- interaction frequency: average timeframe for competitive reaction on competitive price setting decisions, days;
- demand fluctuations: high season sales compared vs low season sales, %;
- market innovations: market share of product innovations, %;
- product differentiation: average price per liter for top price segment divided by average price per liter for the whole portfolio, %;
- multi-market contact: competitive interaction in more than one national market, yes or no

Table 13. List of factors used during interviews for assessment of factor significance.

Factor	Description	Impact
market concentration	sum of market shares of top 4 key competitors (strategic competitive group), %	direct
industry demand	beer industry sales, mln litres	direct
competitors' asymmetries	proportion of competitors' market shares, %	inverse
direct and indirect agreements	presence of direct or indirect agreements, for example, mutual investment projects, participation in industry unions ecc, yes or no	direct
market transparency	availability of information on market development and competitive actions, yes or no	direct
entry barriers	average number of new companies joining the competitive group per year, number	direct
interaction frequency	average timeframe for competitive reaction on competitive price setting decisions, days	direct
demand fluctuations	high season sales compared vs low season sales, %	inverse
market innovations	market share of product innovations, %	inverse
product differentiation	average price per liter for top price segment divided by average price per liter for the whole portfolio, %	inverse
multi-market contact	competitive interaction in more than one national market, yes or no	direct

The input list of factors used for interview can be found from the Table 13 above.

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5.2.2   Interview Questions and Results

The first step of customization, ie customized description of factors, is followed by the second customization step of assessment of factors' significance in form of interviews.

Interview questions are "please assess significance of each factor applied to the case company: not significant or significant" and "if needed, please offer any additional significant factors outside the list";

The results of interview are assessments of factors' significance and additionally proposed factors. The results can be found from the table below, the additionally proposed factors are described under the table.

The Table 14 with output list of factors resulting from interview includes four columns: factor, impact, inside/outside the input list and significance.

Columns "Factor" and "Impact" are already described above.

Column "Inside/outside the input list" points to whether a factor is retrieved from the input list used for interview or is offered by interviewees.

Column "Significance" is assessment of factors' significance: 0 for a non-significant factor, 1 for a significant factor. Impact is calculated as median of individual interviewees' assessments.

Table 14. Results of assessment of factor significance

Factor	Impact	Inside/ outside the input list	Significance			
			CMO	HCPP	HBI	Final score
market concentration	direct	inside	1	1	1	1
industry demand	direct	inside	0	1	1	1
competitors' asymmetries	inverse	inside	0	1	0	0
direct and indirect agreements	direct	inside	0	0	0	0
market transparency	direct	inside	1	1	1	1
entry barriers	direct	inside	1	0	0	0
interaction frequency	direct	inside	1	0	0	0
demand fluctuations	inverse	inside	0	1	0	0
market innovations	inverse	inside	0	0	0	0
product differentiation	inverse	inside	1	1	1	1
multi-market contact	direct	inside	0	0	0	0
CPI	direct	outside	1	1	1	1
presence of market leader	direct	outside	1		1	1
importance of national market for the international group	direct	outside	1	1		1

During the interviews three additional factors were proposed (initiators and significance are to be found from the table above):

• current price index (CPI) reflects a level of overall price inflation in national economics and is measured as accumulated price growth by the end of scope period compared to its beginning. Inflational pressure significantly facilitates price collusion acting as a stimulus uniformly forcing the competitors to lift prices. Moreover, buyers' resistance to manufacturers' price increase melds due to ubiquitous and objective character of price growth;

• presence of market leader, ie of a company clearly dominating over competitors, most likely due to its market share, and acting as a price leader. Market leader performs an important function of signalling readiness to collusion through price increases, this way bringing synchronization into competitors' pricing moves and facilitating collusion;

• importance of national market for the international group demonstrates a share of national business in overall business of an international group, first of all, in terms of profit. The higher share is, the stronger is orientation to profit maximization and, consequently, inclination to long-term collusion. On the contrary, minor contribution of national market eases experiments with pursuit of business targets beyond profit maximization such as, for example, brand building or market share conquest

5.2.3 Comments to Interviews

Providing comments and interpretations to interviews outcomes, I would like to point at clear context dependency of answers: the factors found significant have been acute and acting for the case company and for recent time. Next, it is possible to figure out three reasons why a factor can be considered as not significant:

- impact is unclear as detached from practical business level. Examples are factors of multimarket contact and agreements with competitors. These factors belong to international or intercompany management levels posing beyond operational management level;

- impact is unclear due to its abstract character. Interaction frequency is theoretically important shaper of collusive orientation though comprehension of its decisive and direct impact does not readily emerge when applied to the business case;

- redundancy of factors in given context. For example, for the business case under consideration presence of market leader overlaps with and dominates over the factor of players' asymmetries, though in different context the latter could be independently included into the list of significant factors.

Again, it should be noted at this point that the reasons of non-significance are dependent on Case company and may change in time, so urge for regular review of factors' significance is evident.

5.3 Performance of Factors

Factors' performance is essential element of the tool as it is necessary to quantify each factor's impact on competitive pricing reaction.

According to performance, the factors are assessed as either growing or decreasing (factors with numerical measures according to their description in the case company's context which can be found from the table 13 "List of factors used during interviews for assessment of factor significance") or as either present or not present (factors with measures "yes" or "no" according to their description):

Below is the list of factors found significant during interviews (output list resulting from interview) and assessments of performance for each factor. According to each factor's

description in the case company's context a factor can be characterized either as growing/decreasing or as present/not present:

- market concentration: growing/decreasing
- industry demand: growing/decreasing
- market transparency: yes or no
- product differentiation: growing/decreasing
- CPI: growing/decreasing
- presence of market leader: yes or no
- importance of national market for international group: yes or no

5.4   Tool Proposal

The tool being developed summarizes the previous stages of research in form of the table and the total impact range. The aim of the tool is to quantify factors' impact on competitive pricing reaction.

The table (pls see Table 15 below) includes the factors found significant for collusion during interviews and has four columns: factor, impact, performance and impact.

The columns "Factor" and "Impact" are already described above.

The column "Performance" holds assessments of factors performance (please see the previous subchapter).

The column "Impact" characterizes factors' impact on competitive orientation to tacit collusion. "+1" means that a factor acts pro-collusively. "-1" means that a factor acts anti-collusively.

The impact for each factor is calculated using factor's impact type and performance:

- if impact type is direct and performance is growing or factor is present then factor acts pro-collusively and impact is +1;
- if impact type is inverse and performance is decreasing or factor is not present then factor acts pro-collusively and impact is +1;

- if impact type is direct and performance is decreasing or factor is not present then factor acts anti-collusively and impact is -1;

- if impact type is inverse and performance is growing or factor is present then factor acts anti-collusively and impact is -1

Table 15. The tool (table with significant factors).

Factor	Impact type	Performance	Impact
market concentration	direct	growing / decreasing	+1 / -1
industry demand	direct	growing / decreasing	+1 / -1
market transparency	direct	yes / no	+1 / -1
product differentiation	inverse	growing / decreasing	+1 / -1
CPI	direct	growing / decreasing	+1 / -1
presence of market leader	direct	yes / no	+1 / -1
importance of national market for the international group	direct	yes / no	+1 / -1

The total impact range is the second inherent part of the tool. The total impact range shows whether competitors are likely to follow the case company's price increase or not.

The range comprises three values: total impact, minimum impact and maximum impact. The total impact is a sum of impacts for all the significant factors. If the total impact is above 0, then most of the factors favour collusion and competitors are likely

to follow the case company's price increase. If it is below 0, then competitors are not likely to follow the case company's price increase.

The minimum impact is a potential value when all the significant factors act against collusion.

The maximum impact is a potential value when all significant factors act in favour of collusion.

Together minimum and maximum impacts set the boundaries for the total impact: the closer is the total impact to the minimum value, the more likely competitors will not follow the case company's price increase, and vice versa.
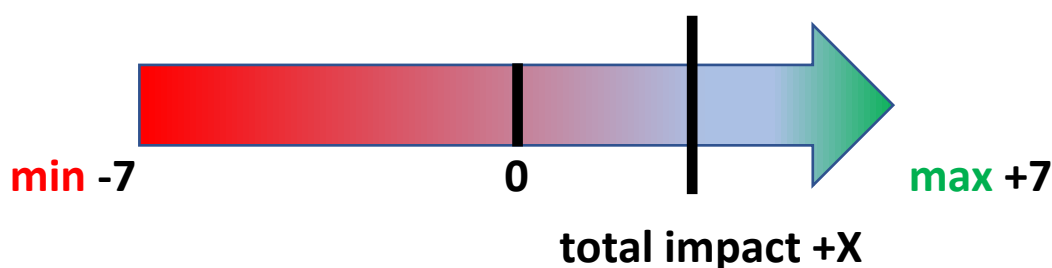

Figure 7. The tool (total impact range).

The Figure 7 above presents the total impact range which is a second part of the tool.

6   Proposal Validation

In this chapter I validate the developed tool for prediction of competitive reaction to price increase. First, I apply the developed tool to the actual market data. Second, I show that the tool results match actual competitive pricing behaviour. Third, I interview the corporate pricing decision makers whether the tool brings additional business value for the case company.

6.1   Actual Performance of Factors

Performance of factors is assessed within time period from January 2013 to March 2016 (choice of scope period is grounded in chapter "Current state analysis").

Market concentration according to its description in the case company's context (can be found from the table 13 "List of factors used during interviews for assessment of factor significance") is measured as sum of market shares of top 4 key competitors (strategic competitive group). According to market database, the sum of market shares went down from 77% to 73%. Therefore, this factor is assessed as decreasing.

Industry demand is measured as beer industry sales. According to market database, the sales went up 31% within the scope period. Consequently, the factor is growing.

Market transparency, ie availability of information on market development and competitive actions, is assessed as whether present or not. This kind of information is readily available via the market database, therefore the factor of market transparency is present.

Product differentiation is measured as average price per liter for top price segment divided by average price per liter for the whole portfolio. According to internal corporate data, the measure went down 12% which points at decreasing performance of factor.

CPI (current price index), ie accumulated price growth by the end of scope period compared to its beginning, is increasing as it grew up 43% for the scope period according to national statistics.

Presence of market leader is characterized by its market share compared to the second largest player. Within the scope period the leader's market share fluctuated around 45% (within strategic competitive group) while the second largest player had around 20%. This proves that market leader is present.

Importance of national market for international group is measured as a share of profit from national business in overall profit of an international group. According to public corporate reporting, share of national market is high (20%) for the case company and low (2-3%) for the other key competitors. Consequently, the factor is not present.

Assessments of factors' performance are summarized in the Table 16 below:

Table 16. Actual factor performance

Factor	Performance
market concentration	decreasing
industry demand	growing
market transparency	yes
product differentiation	decreasing
CPI	growing
presence of market leader	yes
importance of national market for the international group	no

The tool applied to the actual data can be found from the Table 17 and Figure 8 below.

Table 17. The tool applied to actual data (the table).

Factor	Impact type	Performance	Impact
market concentration	Direct	decreasing	-1
industry demand	Direct	growing	+1
market transparency	Direct	yes	+1
product differentiation	Inverse	decreasing	+1
CPI	Direct	growing	+1
presence of market leader	Direct	yes	+1
importance of national market for the international group	Direct	no	-1

min -7　　　　**0**　　　　**max +7**

total impact +3

Figure 8. The tool applied to actual data (total impact range).

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The total impact is above 0, this means that competitors are likely to follow the case company's price increase.

6.2   Validation with Actual Competitive Pricing Behaviour

The observed competitive pricing behaviour is illustrated using two figures. The first figure shows yearly average price increases by the case company and competitive group. The second figure demonstrates monthly dynamics of price parity for case company and competitive group.
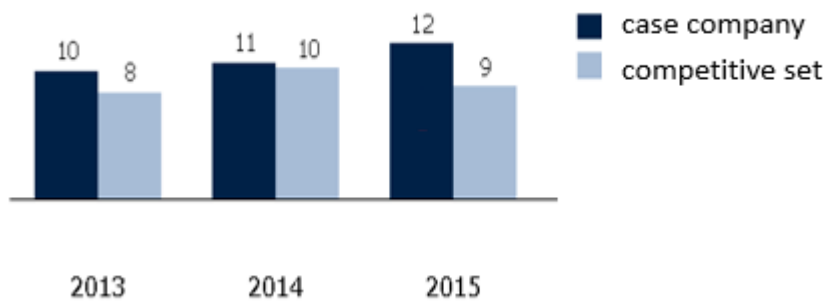

Figure 9. Yearly price increases, 2013-2015.

The Figure 9 highlights the pattern of competitive pricing behaviour: the competitive group each year follows the price increases of the case company though slightly less aggressively.
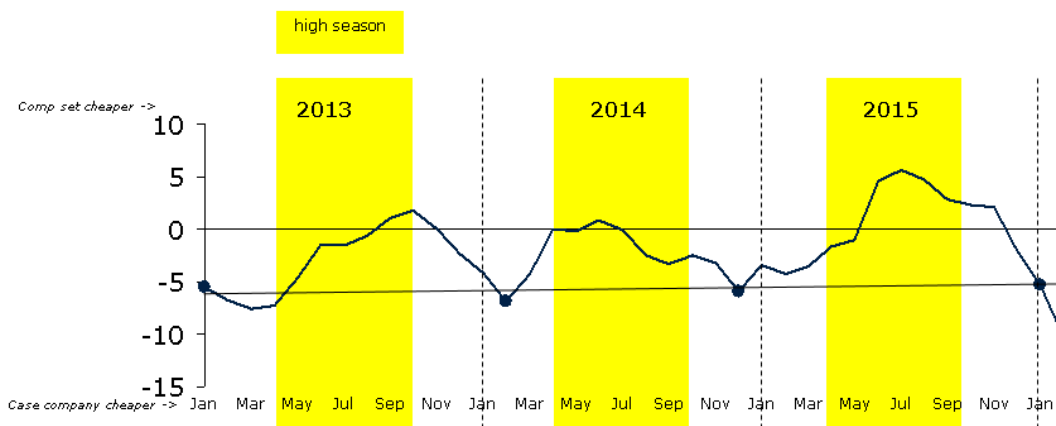

Figure 10. Monthly price parities, 2013-2015.

The Figure 10 brings more detail on price increases. It is visible that before the high season the price parity is around -5%, ie the average price of the case company is 5% lower than the average price of the competitive group. During the high season the price parity rises above 0 due to price increases of the case company. After the high season the price parity falls back to -5% due to price increases of the competitive group. This pattern repeats for each year.

Consequently, the competitors follow the price increases of the case company during the scope period which coincides with the tool results (subchapter 6.1 "Actual performance of factors"). This way the tool passes validation with actual competitive pricing behaviour.

6.3   Validation with Interview

The second stage of tool validation is executed with help of corporate pricing decision makers in form of interviews. Interview purpose is to discuss the results of tool application to the case company, including the findings of first stage of tool validation with actual competitive pricing behaviour.

The interview question is "do you think the results of tool application and validation with actual competitive pricing behaviour generate additional business value?"

The interviews findings are summarized below. The findings can be categorized into two groups: opinions about the tool (1-3 points) and ideas on further development (4-7 points):

•   the tool's prediction that competitors are likely to follow the case company's price increase within the scope period (since 2013) looks surprising, especially given perceived competitive aggressiveness in 2015 (drawn from all three participants' interview);

•   detailed analysis of actual competitive pricing behaviour showing that competitors follow price increases of the case company makes perfect sense and changes the previously dominant point of view that the competitors stopped to follow case company's price increases in 2015 (drawn from all three participants' interview);

- the tool prediction is highly valuable and could have retained the case company from the aggressive pricing in 2016 which was an answer to perceived competitive aggressiveness in 2015;

- the tool not only serves for direct purpose of prediction of competitive reaction to price increase but also acts as insightful entry point to further enhancement of strategic management. Knowledge what is current orientation to collusion and which factors shape it constitutes a base for the next step on pro-active management of collusion orientation, ie managing the collusion factors in order to achieve desired state of collusion (drawn from interview with Chief Marketing Officer);

- next strategic management domain uncovered by tool application is generation of market signals. Currently the main signal is price increase as such, though additional signalling techniques can be elaborated in order to accentuate case company's price leadership and commitment to collusion support (drawn from interviews with Chief Marketing Officer and Head of Commercial Planning and Pricing);

- the tool inputs (factors significance and factors performance) should be regularly updated, yearly update looks reasonable due to strategic character of tool recommendations (drawn from interview with Head of Commercial Planning and Pricing);

- performance of highly important factors should be monitored continuously in order not to miss a critical impact on collusive orientation (drawn from interview with Head of Business Intelligence);

The summarizing outcomes of second stage of tool validation are, first of all, stakeholders' perception of additional business value form the tool, and, second, comprehension of vast potential of further development of strategic managerial competences initiated by introduction of the tool as a core prerequisite.

7   Discussion and Conclusions

The case company studied in this Thesis is Baltika breweries, market leader of the Russian beer market, part of the global Carlsberg Group.

The company has always behaved as an industry's price leader. When Baltika breweries raises prices, it expects that the other competitors will follow. However, sometimes the competitors do not follow the case company's price increases. As a

result, the average price of Baltika's portfolio becomes less attractive compared to competitors. Consequence is a loss of market share and profit of the case company.

The harm for business performance induced by a price increase not followed by competitors is recognized by the case company's management. Nevertheless, the risk of this harm is considered as inevitable due to perceived unpredictability of competitive pricing reaction.

The solution which I proposed to solve the business challenge is a tool helping to predict competitive reaction to the case company's price increase.

I reviewed the existing tools addressing the business challenge. Unfortunately, I found that these tools are not relevant for the business case under my consideration. Consequently, I decided to develop my own customized tool.

As soon as the case company is an oligopoly (as pointed by analysis of its current state and business context), I began bulding a tool's conceptual framework with exploration of oligopolistic theory. The oligopolistic theory highlighted that competitors tend to follow each others' price increases.

The situation when competitors coordinate pricing actions without explicit communication is called a tacit collusion. It is legally allowed and beneficial for competitors as lets them raise prices without losses of market share.

The study of tacit collusion phenomenon led me to a number of factors considered within body of knowledge as making significant impact on achievement of tacit collusion. The list of these factors and their impact type (direct or inverse) was a main outcome from exploration of body of knowledge.

In order to build a customized tool, I needed to adjust the retrieved list of factors to the case company. During the interviews with corporate pricing decision makers I deleted the factors considered as not significant for the case company and added new ones which were outside the initial list.

To calculate an impact of customized significant factors on orientation to tacit collusion, I included "factor performance" and "impact" measures into the tool. If a factor with

direct impact type is growing then it has a positive impact on orientation to tacit collusion (id est impact is +1). If a factor with direct impact type is decreasing then it has a negative impact on orientation to tacit collusion (id est impact is -1), and so on.

The sum of each factor's impacts gives a total impact. If the total impact is positive then competitors are likely to follow the case company's price increase. If the total impact is negative then competitors are likely not to follow the case company's price increase.

The developed tool was successfully validated using the actual market data on competitive pricing behaviour and using interviews with corporate pricing decision makers.

The tool has high practical value for the case company. It shows in clear way whether the case company can increase prices (if the tool's total impact is positive) or should retain from price lifting (if the tool's total impact is negative). A price increase followed by competitors will bring additional profit while nut putting market share at risk. A decision not to raise prices due to high likelihood of competitive aversion will save the market share and profit of the case company.

The tool is easy to use. A user needs only to measure performances of the significant factors, add values into the tool and calculate the total impact. According to corporate pricing decision makers, it is enough to measure performances once per year.

One more observation retrieved from interviews is a necessity to reconsider the list of significant factors, but also not more frequently than once per year.

More to the point, the tool's customization via reconsideration of significant factors opens vast potential to apply it to numerous other oligopolistic industries.

The next step in mastering the competitive pricing reaction can be a step from understanding and measuring to proactive shaping of tacit collusion factors. For example, let it be that the tool does not consider an industry situation as suitable for a price increase. Nevertheless, the case company executes actions to promote market transparency and this way increases likelihood that competitors will follow the price increase. The topic of proactive manipulation of competitive price reaction deserves

additional thoughtful consideration and represents possible further development of the research.

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