

Promotion of a Specific Scientific Discipline with Focus on Biochemistry

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2. Stanovte cíl práce, výzkumné otázky a výzkumné metody.
3. Zrealizujte marketingový výzkum vztahující se ke zvolené tématice.
4. Ze získaných dat vyvodte relevantní závěry.
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ABSTRAKT

Tato diplomová práce se zabývá propagací vědeckého projektu. Teoretická část práce vysvětluje potřebnou terminologii a poukazuje na propagaci vědy v Česku a v zahraničí. Také popisuje výzkum a zvolenou metodologii práce. Analytická část je rozdělena na výzkum primárních a sekundárních dat. Výzkum sekundárních dat se zabývá bariérami v komunikaci vědy, analýzou marketingových komunikací NASA, vědou na sociálních médiích, PR a reklamou ve vědě. Primární výzkum je pojat jako interview. Na základě zjištěných informací jsou ukázány konkrétní návrhy, zvolené komunikační kanály, a také analýzy, jako je analýza rizik nebo SWOT analýza, které jsou popsány v projektové části. Tato kapitola je uzavřena dalšími doporučeními. Hlavní cíl této práce je navrhnout propagaci vědeckému projektu zajímavým způsobem.

Klíčová slova: propagace, věda, biochemie, vědecký projekt, propagace vědy, bariéry v komunikaci vědy, kvalitativní výzkum a analýza

ABSTRACT

This thesis deals with promotion of scientific project. The theoretical part introduces necessary terminology and reveals promotion of science in the Czech Republic and abroad. It concludes by describing the research and the methodology used. The analytical part is divided into primary and secondary data research. The secondary data research deals with barriers in science communications, an analysis of marketing communications by NASA, science on social media, PR or advertising in science. The primary data research is made as an interview. The project part reflects on the facts explained throughout the thesis. Based on previous findings it shows the proposed choice of media channels and offers different analysis, such as a risk analysis or SWOT analysis. It concludes with the final recommendations and summary. The main goal of this thesis is to create promotion of scientific project in an interesting way.

Keywords: promotion, science, biochemistry, scientific project, promotion of science, barriers in science communications, qualitative research and analysis

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I hereby declare that the print version of my Master's thesis and the electronic version of my thesis deposited in the IS/STAG system are identical.

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INTRODUCTION

„Nothing in life is to be feared, it is only to be understood. Now is the time to understand more, so that we may fear less.“

Marie Curie

Science helps to satisfy many basic human needs and improve living standards. And in science there is never a good enough. As we move from understanding the basic laws of physics, to realizing that even the basic laws are far more complex than we had ever imagined, we gain more insight in how we can better solve problems in our world. Science gives us superpowers, like looking across the universe, seeing atoms, flying across the Earth or to the moon, moving mountains, and harnessing the energy of the sun.

Since I started studying marketing at my university, few friends of mine went to study science. I have been always curious about space and science itself, but I could never properly and deeply understand many scientific issues, even though my friends tried their bests to explain. The communication always got stuck at some point. On the other hand, my friends, the scientists, have troubles to promote the science for a public. When I was visiting lectures at the Academia Film Olomouc, I have realized that promotion of science is a field, to which marketers should pay much more attention. For marketing companies, it could be interesting to “sell” unique products in the form of the newest discoveries, which do not need artificial creation of wow effects.

This thesis deals with promotion of scientific project focused on biochemistry. It contains of three main parts: theoretical, analytical and project part. The theoretical part introduces necessary terminology and also describes the research and the methodology used. The analytical part is divided into primary and secondary data research. The secondary data research deals with barriers in science communications, an analysis of marketing communications by NASA, Science on social media, PR or advertising in science. The primary research is made as an interview. The project part reflects on the facts explained throughout the thesis. Based on previous findings it shows the proposed choice of media channels and offers different analysis, such as a risk analysis or SWOT analysis. It concludes with the final recommendations and summary. The main goal of this thesis is to create promotion of scientific project in an interesting way.

I. THEORY

1 MARKETING

Philip Kotler describes marketing as “*the science and art of exploring, creating, and delivering value to satisfy the needs of a target market at a profit.*” (Kotler Marketing Group 2017) Similarly describes marketing Kuchner in his book *Marketing for scientist*: “*Marketing is the craft of seeing things from other’s people perspectives, understanding their wants and needs, and finding the ways to meet them.*” (Kuchner 2012, 13)

Marketing communication is then defined as the sharing of information, concepts, and meanings about products, services and the organization that sell them, by the source and receiver. It is targeted interaction with customers and prospect using one or more media such as newspapers and magazines, direct email, television, radio, the Internet and others. (Kayode 2014, 9) According to Kayode, marketing communications is essentially part of the marketing mix. The marketing mix defines the 4Ps of marketing – price, place, product and promotion. Promotion is what marketing communications are all about. (Kayode 2014, 9) Promotion does not necessarily need to create profit, but can only be beneficial to development in society as it is the case of social marketing.



Figure 1: Promotional mix

Source: LabsExplorer 2017

1.1 Promotional mix

A promotional mix is a combination of different marketing strategies used to communicate the benefits of using a particular product or service and to influence the buying behaviour of their target group. The marketing strategies that create the promotional mix are:

- **Personal selling** is a marketing technique which is made face-to-face between a salesperson and a customer. The salesperson tries to persuade a customer in buying a particular product (tries to highlight various features of the product to convince the customer that it will only add value), or often the companies and brands try to follow this approach with customers to make them aware of a new product. The salesperson is the key factor in this tactic and it is necessary that he or she is aware of how to sell the needs of a customer.
- **Direct marketing** focuses on individual members of defined consumer groups. The message is delivered to predisposed consumers and is based upon a clear “call to action”. The advantage of this marketing technique is that it can provide valuable and reliable consumer and sales data and quantifiable success metrics for analysis.
- **Public relations** is communicated through the media in the form of publicity events, press releases including video and audio news releases, speaking opportunities, social media, newsletters, blogs, press kits, and outbound communication to members of the press. As an ideal result of this marketing technique is to serve with information both: the source and the public interest.
- **Sales promotions** is supposed to increase the perceived value of a product through incentives or activities such as offers, discounts, gifts, sweepstakes, prizes, free samples etc. Sales promotions is an effective strategy commonly used when launching a new product to market when marketers want to win market share from competitors, or to have a rapid increase in sales.
- **Advertising** is used by marketers to communicate message to a targeted consumer group via means including print, the internet, radio and television, mobile phone and others. The integral part of this marketing technique is the media plan, which is developed simultaneously with the creative strategy, schedules how and when consumers see the advertisement. The advertisement usually illustrates the product’s value and gives consumers a reason to take the action.

- **Internet presence** is a big promotional marketing channel. Nowadays, the use of social media is a must. Having good content on your website and spreading this content on your social media is the first way of promoting your product on the internet. (Lumen 2019)

1.2 Social marketing

Social marketing is the use of principles and techniques which belong to commercial marketing to promote the adoption of a behaviour that will improve the well-being of the target audience or the society as whole. What makes the difference between social marketing and commercial marketing is its purpose. Social marketing benefits to individual or society rather than make a profit to marketer's organization. (Weinreich 2006, 4) The aim is to change behaviour and to plan, organize and fulfil needs of society in a sustainable and cost-effective way. As a primary competition, we can consider the current or preferred behaviour of the target segment.

1.2.1 Planning social marketing project

When starting a social marketing project following steps should be considered:

➤ **Getting started**

At first, marketer, who is starting the social marketing project, has to define the issue or challenge, the resources and assets it might be able to draw on. Specify the potential risks and initial timescales. He or she has to think about, into what scale the original research of the target audience is need to be carried out.

➤ **Scope**

The scoping phase is where marketer consider which interventions to select, based on what is most likely to achieve and sustain the desired outcome with given resources. Analysing factors that may affect the issue and what can be done about them.

➤ **Develop**

At this point, marketer has analysed target audience and their behaviours and set goals, engaged with key stakeholders and produced a scoping report. A social marketing plan with SMART (specific, measurable, achievable, realistic and time-bound) objectives is set.

➤ **Implement**

Achieving the desired impact on the audience's behaviour within the timescale has been identified.

➤ **Evaluate**

The aims of evaluation are to identify the strengths and weaknesses, determine if it is making a difference, and measure its return on the investment. An evaluation report is created with setting out the original objectives, methods used, outcomes identified and recommendations for further action.

• **Follow-Up**

Sharing evaluation findings enables future developments and interventions to build on its successes and failures. (Social Marketing 2011)

2 SCIENCE

Science is a systematic enterprise that builds and organizes knowledge in the form of testable explanations and predictions about the universe. (Wilson 1999, 49) According to the Science Council science is the pursuit and application of knowledge and understanding of the natural and social world following a systematic methodology based on evidence. (Science Council, 2019)

Biochemistry may be defined as “*the science, of chemistry, of living matter in its different phases of activity.*” The term “Biochemistry” was first introduced by a German chemist Carl Neuberg in 1903. (Kulkarni 2008)

2.1 Promotion of science

Promotion of science may be defined as putting forward the benefits of science by motivating and engaging non-scientists. Kroc says that promotion of science is an art, and requires talent. Moreover, it is an alchemy that requires the exact rate of simplification, energy transfer, persona fluid, the use of humour and the use of thoughtful comparisons. (Olecká 2012, 9) Above all, Kroc says, that promotion of science requires courage – on the side of promoter as well as on the side of scientists who risk their professional reputation. (Olecká 2012, 13)

Furthermore there is an evidence to suggest that not every medium and very rarely medium among public services, can afford to have a journalist who would be dedicated only to one field for example to biochemistry. We can expect that the expert knowledge of journalist will be shallow. On the other hand, the opposite extreme is not welcomed either. When the journalist is the dedicated expert, there is a risk, that he or she will bogged down to the details, which can be for the reader, viewer or the listener so difficult that he will get confused and lost the interest to pay attention to the issue. (Olecká 2012, 9)

The scientist, according to the pupils and the students, is overly intelligent and hardworking, but unsocial and untidy person. It emerged from the result of the research, which was made in 2007 by the Faculty of Science of the Palacký University in Olomouc between pupils and students of elementary and secondary schools. Of course, this is unreasonable, and the scientist can reach a powerful grant system and highly valued profession. (Olecká 2012, 27)

Before starting the promotion of science, there are few basic questions which have to be answered:

- **What I want to promote?** The result of some particular scientific project? The institution? Or yourself? Something else?
- **Why I want to communicate it to the public?** Does it change anything? Does it help to something? Does it need more money? Is the existence of the research endangered and the public may help? Do I only want to show off the project? Or is there some other reason?
- **To whom exactly is the information intended?** Public is a board term. What target audience I am focusing on?
- **What, in what extent, where and how, from the same or similar field of science, it has been published? Which media suit best to answers the previous questions?** (Olecká 2012, 28)
- **What I want to achieve?** (Ševčík 2009)

2.2 Science worldwide

Expertise, good ideas and creativity do not respect national frontiers. Modern science depends on money, institutions and oodles of brainpower though. Science can only be inclusive if all parties at all levels (government, academic and general public) are duly involved. Thus, access can be defined secondly in the context of openness. Without citizen engagement, no social good can come of open data, since there will be no recognition of local needs for subsequent data downscaling and data mainstreaming. Published papers get you only so far: conferences and face-to-face encounters are essential to grasp the subtleties of what everyone else is up to. But pure science thrive collaboration and exchange. Collaboration is also the best way of ensuring that science is responsible and transparent. (The Economist 2019)

Nowadays, there is a fear what could happen if China dominates science. The reason is that authoritarian governments have history of using science to oppress their own people. Critical thinking, scepticism, empiricism, and frequent contact with foreign colleagues threaten authoritarians, who survive by controlling what people say and think. Figure 2 shows that The United States is still the leading science power, but it is expected to be changed by 2025.

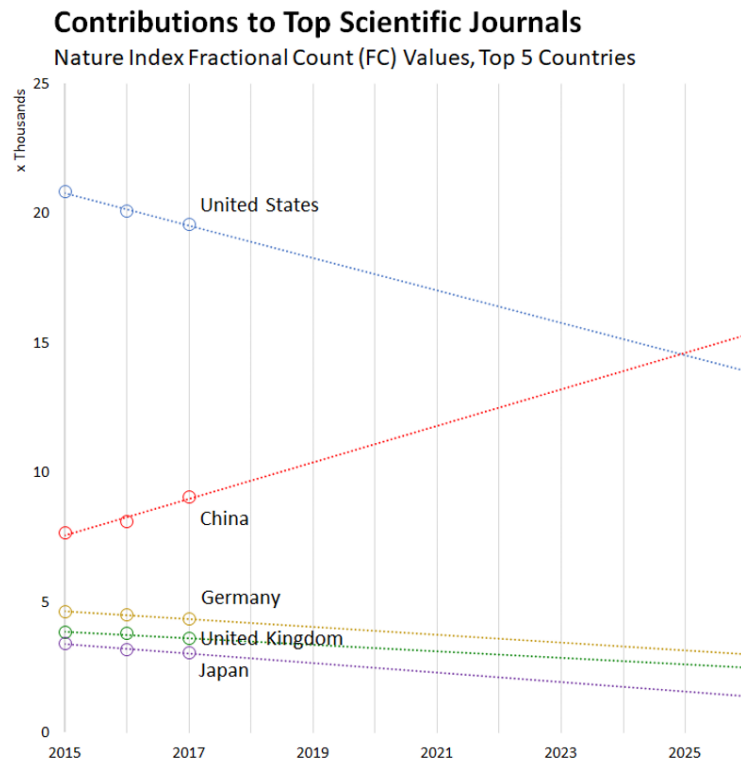


Figure 2: Scientific contribution

Source: Cosmos Magazine

2.2.1 Different approaches in promotion of science worldwide

The US National Science Foundation declares that its mission is to “*promote the progress of science; to advance the national health, prosperity and welfare; to secure the national defence; and for other purposes*”. (National Science Foundation 2019) The Japan Science and Technology Agency states that it “*promotes creation of intellect, sharing of intellect with society, and establishment of its infrastructure in an integrated manner and supports generation of innovation.*” (Japan Science and Technology Agency 2019) On the contrary, The European Union promotion of science is declared as “*...an instrument implementing the Innovation Union, a Europe 2020 flagship initiative aimed at securing Europe’s global competitiveness*” (European Commission 2019) The difference between these declarations and the European one is that the European explicitly prioritizes economic competitiveness and economic growth while the US and Japan put their devotion to knowledge, intellect, and the improvement of society up front.

3 MARKETING RESEARCH

Research can be defined as a systematic activity of collecting data in order to increase knowledge of a certain topic. Data is, then, a numerical or non-numerical piece of information that is collected. (Neuman 2013, 9)

The two approaches appear:

- Quantitative approach – which is about to collect as much data as possible to create a statistical analysis. It focuses on variables and measures facts. (Neuman 2013, 9)
- Qualitative approach – when a researcher is involved and the process is more interactive. It is focuses on a few cases and is influenced by the situation. (Neuman 2013, 9)

Marketing research can be realized from:

- Primary data - made for the first time to get information and data.
- Secondary data - based on published data, processing of freely available data. (MarksMarketing 2019)

3.1 Qualitative Research

Qualitative research is empirical research where the data are not in the form of numbers. (Punch 1998, p. 4) Qualitative data could be much more than just words or a text. Photographs, videos, sound recordings and so on, can be considered as qualitative data. The aim of qualitative research is to understand the social reality of individuals, groups and cultures as nearly as possible as its participants feel it or live it. People and groups are studied in their natural setting. (SimplyPsychology 2017)

Two main approaches to qualitative research:

- **Deductive approach** involves analysing data based on a structure that is predetermined by a researcher. The researcher can use the questions as a guide for analysing the data. Deductive approach is quick and easy and can be used when the researcher has a fair idea about the likely responses that he or she is going to receive from the sample population. (QuestionPro 2019)
- **Inductive approach** is not based on a predetermined structure or set ground rules. This is more time consuming and thorough approach to qualitative data analysis.

Inductive approach is often used when a researcher has very little or no idea of the research phenomenon. (QuestionPro 2019)

3.2 Steps in qualitative research

Qualitative research is an organized process and the main steps are:

1. **Acknowledge self and context** - researchers rely on personal beliefs, biography, or specific current issues to identify a topic of interest or importance.
2. **Adopt a perspective** - qualitative researchers may ponder the theoretical-philosophical paradigm or place their inquiry in the context of ongoing discussions with other researchers. Rather than narrowing down a topic, this means choosing a direction that may contain many potential questions.
3. **Design a study** - requires making many decisions about the type of case or sample to select, and what research technique to employ.
4. **Collect data** - a qualitative researcher is likely to collect data simultaneously.
5. **Analyse data** - often the researcher not only uses or tests a theories from the past, but also creates new ones.
6. **Interpret data** - the qualitative researcher creates new concepts and theoretical interpretations.
7. **Inform others** (Neumann 2013, 20)

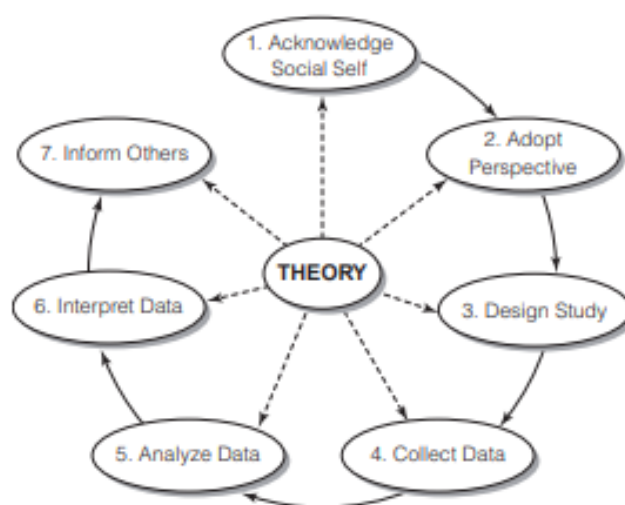


Figure 3: Steps in qualitative approach

Source: Neumann 2013, 21

3.3 Methods of a qualitative research

The researcher has several methods for collecting empirical materials, ranging from the interview to direct observation, to the analysis of artefacts, documents, and cultural records to the use of visual materials or personal experience. (Denzin and Lincoln 1994, p. 14)

A popular and helpful categorization separate qualitative methods into five groups: ethnography, narrative, phenomenological, grounded theory, and case study. John Creswell outlines these five methods in *Qualitative Inquiry and Research Design*. (MeasuringU, 2019)

Method	Focus	Sample Size	Data Collection
Ethnography	Context or culture	—	Observation & interviews
Narrative	Individual experience & sequence	1 to 2	Stories from individuals & documents
Phenomenological	People who have experienced a phenomenon	5 to 25	Interviews
Grounded Theory	Develop a theory from grounded in field data	20 to 60	Interviews, then open and axial coding
Case Study	Organization, entity, individual, or event	—	Interviews, documents, reports, observations

Figure 4: Qualitative methods

Source: MeasuringU, 2019

3.3.1 Qualitative research interview

Qualitative research interview emphasizes open-ended, non-leading questions, focused on personal experience and seek to build rapport with an interviewee. The balance between the person answering and the interviewer may be seen to be more powerful within the position of the interviewer, however the balance is often complicated by factors such as age,

gender, etc. Qualitative interviewers usually try to minimize any power imbalance between the parties. Characteristic of the generic qualitative interview:

- It is open-ended and flexible in style.
- It tends to focus on people's actual experiences more than general beliefs and opinions.
- Crucial to the method is the relationship between interviewer and interviewee. (Interviews in Qualitative Research 2010)

Steps in preparing questions of the interview:

1. Prepare the large research questions of the study.
2. Adjust the language of the interview according to the respondent (professional, child).
3. Ask "how" questions rather than "why" questions to get stories of process rather than acceptable "accounts" of behaviour.
4. The more detail, the better! – Develop probes that will elicit more detailed and elaborate responses to key questions.
5. Begin the interview with "warm-up" questions.
6. Think about the logical flow of the interview. What topics should come first and what should follow? What follows more or less naturally?
7. When rapport has been established, difficult or potentially embarrassing questions should be asked – usually at the end of the interview.
8. The very last question should provide some closure for the interview. The last question should leave the respondent feeling empowered, listened to and glad that they talked to you. (Sociology Harvard 2019)

4 THE SUMMARY OF THE THEORETICAL PART

The theoretical part prepared the base for the practical part and necessary information that are needed for the next chapters of this thesis. Based on the academic literature and other sources, it defined the basic marketing concepts and terminology, such as what a promotional mix and social marketing is. The steps of planning a social marketing project were outlined and the science and promotion of science were described. Last but not least, science in different parts of world was discussed.

Furthermore, marketing research, its approaches, steps and methods of qualitative research are described in details. At the end of the chapter, the methodology that is used in the next steps was depicted and the aim of the thesis and hypothetical question was formed. With the based information mentioned earlier, the research and evaluation of the results can be done. Next part will elaborate the methodology of this thesis, its main goal, research questions and research methods.

5 METHODOLOGY

In order to find out what kind of promotional mix to choose to create a successful promotion of scientific project, qualitative secondary data research out of online available material will be conducted. First of all, this research is going to find barriers, which can be crucial for marketing communication of science. Next chapter of secondary research is going to be dedicated to present successful promoters of science, especially those working for NASA. The last part of secondary research is going to be oriented on finding out some interesting ways of promotion science.

Then the primary data research follows. This research is going to be made as an interview with Mgr. Martina Janků, PhD student of Biochemistry at Palacký University Olomouc, and the head of the biochemistry project (involvement of nitric oxide in signalling and regulation mechanism of defence response of plants and the immune system of honey bees), which is crucial for the project part of this thesis. The goal of the promotion and the budget are going to be determined, target group is going to be defined, and the requirements are going to be specified in the following subchapters.

5.1.1 The main goal

The main goal of the thesis is to make more people interested in mechanisms of plant defence responses and in the honeybee's immune system. The aim of this thesis is to plan a promotion for the scientific project of Mgr. Martina Janků. It is expected, that the thesis is going to suggest the promotion of scientific project in some interesting way.

5.1.2 Research questions

To meet the main goal of the thesis, the following research questions are stated:

RQ 1: How can be science promoted in an interesting way?

RQ 2: Are natural scientific disciplines promoted at sufficient level?

The first research question is to find out how to promote science in an interesting way. Furthermore, this thesis is supposed to answer question, if the science is promoted at sufficient level at the moment.

5.1.3 Research methods

As was mentioned earlier, primary and secondary researches are going to be carried out. Both of the researches are going to be made by narrative method, focusing on individual experience and sequence from personal stories and documents. Secondary research is going to be based mainly on data available online. Primary research is going to be made as an in-depth interview. The questions for this type of interview are going to be based on findings from the theoretical part and primary research. Because it is not possible to make a face-to-face interview as Ms. Janků is currently in Italy working on her research, Skype will be used to make the interview.

Interviews are designed to collect a richer source of information from a small number of people about attributes, preferences, opinions, knowledge, feelings, etc. Interview help to explain, better understand, and explore research subject's opinions, behaviour, experiences, etc. Questions are usually open-ended so that in-depth information will be collected. The interviewing method is flexible and adaptable.

The disadvantage of the interview is it's time consuming and there is possibility of biases of the interviewer or the respondent as well. The interviewing method is impractical with large number of respondents and sometimes, it can be also difficult to summarize the responses. (Research Methodology 2019)

II. ANALYSIS

6 INTRODUCTION TO ANALYTICAL PART

The analytical part is going to be divided into primary and secondary data research. Then, the analytical part is going to start with the secondary data research, primarily to familiarize the reader with the issue and to acquaint the reader with the necessary knowledge to be able to follow up the primary research. In the secondary research, barriers in science communication, an analysis of marketing communication by NASA, science on social media, public relations, personal selling and advertising of science are going to be described. Then, primary research is going to be focused on the interview with Mgr. Martina Janků, and the main outcomes for the project part are going to be mentioned.

7 SECONDARY DATA RESEARCH

Imagine a “product” which you need to promote to the general public but only small group of people understands it properly. Science is a challenge of internal and external communication. But according to Bredl, expert institutions understand the growing need for its promotion. Among the main goals of marketing communications belongs to offer and promote some product or service. The core problem in popularization and promotion of science is its incomprehension. (MAM 2016)

Furthermore, Grossman, the group director of communications at the Department for Business, Innovation and Skills in the UK, says that *“the art of science communication is to pitch something as complicated as quantum mechanics in a way that is not only engaging but also faithful to the evidence.”* (The Guardian 2014) He believes that the great science communicators are needed and there is a duty to communicate researches and innovations, and the value that it brings to the economy and society, as well as possible. Taxpayers should understand where their money is being spent. (The Guardian 2014)

7.1 Barriers in Science Communications

At first, a promoter of science has to break through the fear of something complicated and incomprehensible and let the non-experts of the scientific field become curious about the specific case. These barriers can be caused by language, person’s attitude to science, scientist’s personality, pseudoscience, finance or even scientific patents.

7.1.1 Language

In front of scientists and marketing communications specialists stands a difficult task – how to pass those scientific successes and developments to public. David Píša, from the Institute of Physics of the Czech Academy of Science, mentions, that if we want to communicate something to public or to journalists, we have to presuppose that the level of expert language and different abbreviations are limited. Scientists and experts have to search for frontiers in between when they simplify language which they use to talk to laics, and when they simplify pieces of knowledge itself, which can be degraded by using the wrong terminology. (MAM 2016) Science communication has its “3Cs” of clarity, correctness, and conciseness. (Complete Science Communication 2018, 19)

According to Miltová, the language of science is a functional abstraction which explains facts. Each scientist field creates and uses its own form of expression – “languages” which have some common features and which are different from the language of everyday communication, or also so called artistic language. “*Actually, there is no universal language common for all scientific fields,*” adds Miltová. (Sociologická encyklopedie 2017) Each science as for example biochemistry, psychology, philosophy or chemistry, reduces the richness of the natural language because those scientist fields use the language for the most accurate statements. This reduction is accomplished with creations of its own terminology, summary of professional terminology – either expert terms undertaken from natural (native or foreign) language, or artificially created terms, which connotations are unambiguously stated by definitions. (Sociologická encyklopedie 2017).

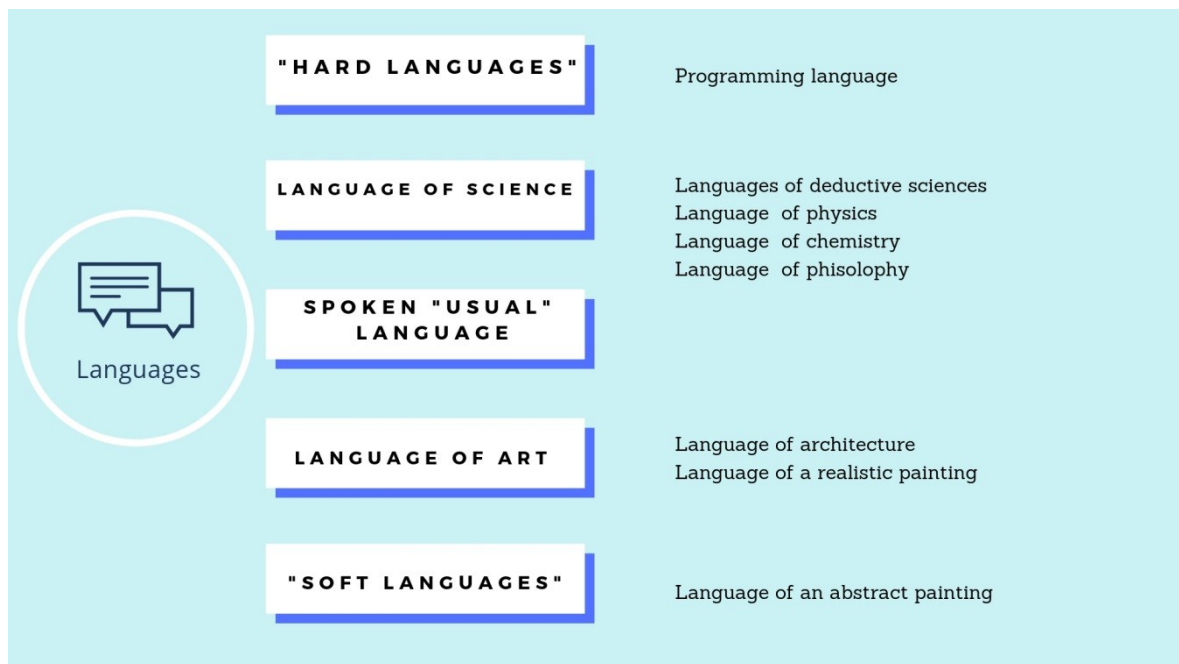


Figure 5: Languages

Source: Sociologická encyklopedie (own design)

Language of science through centuries and now

English is most probably the language of science in the modern world, with an estimated 98% of all scientific publications being written in the language. But in the past, it has not always been that way. Before the 17th century, scientific publications were mostly written in Latin. By the mid-19th century, there were three primary languages used to promote scientific thoughts: English, French and German. By 1900, the dominant language of science was German, and thanks to leading scientists like Einstein, Heisenberg and others, it re-

mained that way until the World War I. Conflicts throughout the 21st century, including both World Wars and the Cold War, transformed the way scientists around the world communicated with each other, and by the mid-1990s English had steadily established itself as the language of science. Nowadays, anyone who wants to share their ideas must publish their work in English. Even many scientific textbooks aimed at students in non-English speaking countries are written in English, and these students are required to have proficient English in order to pursue degrees and eventually careers in the sciences. (Morningside Translations 2016)

Following Figure 6 explains that the use of English language has continued to rise strongly in the Netherlands, Italy and the Russia over the past four years. It has also increased somewhat in Germany, but remained relatively stable in France, Spain and China. However, in Brazil, the ratio between the use of English and Portuguese is clearly decreasing. Overall, the use of English clearly continues to increase over time.

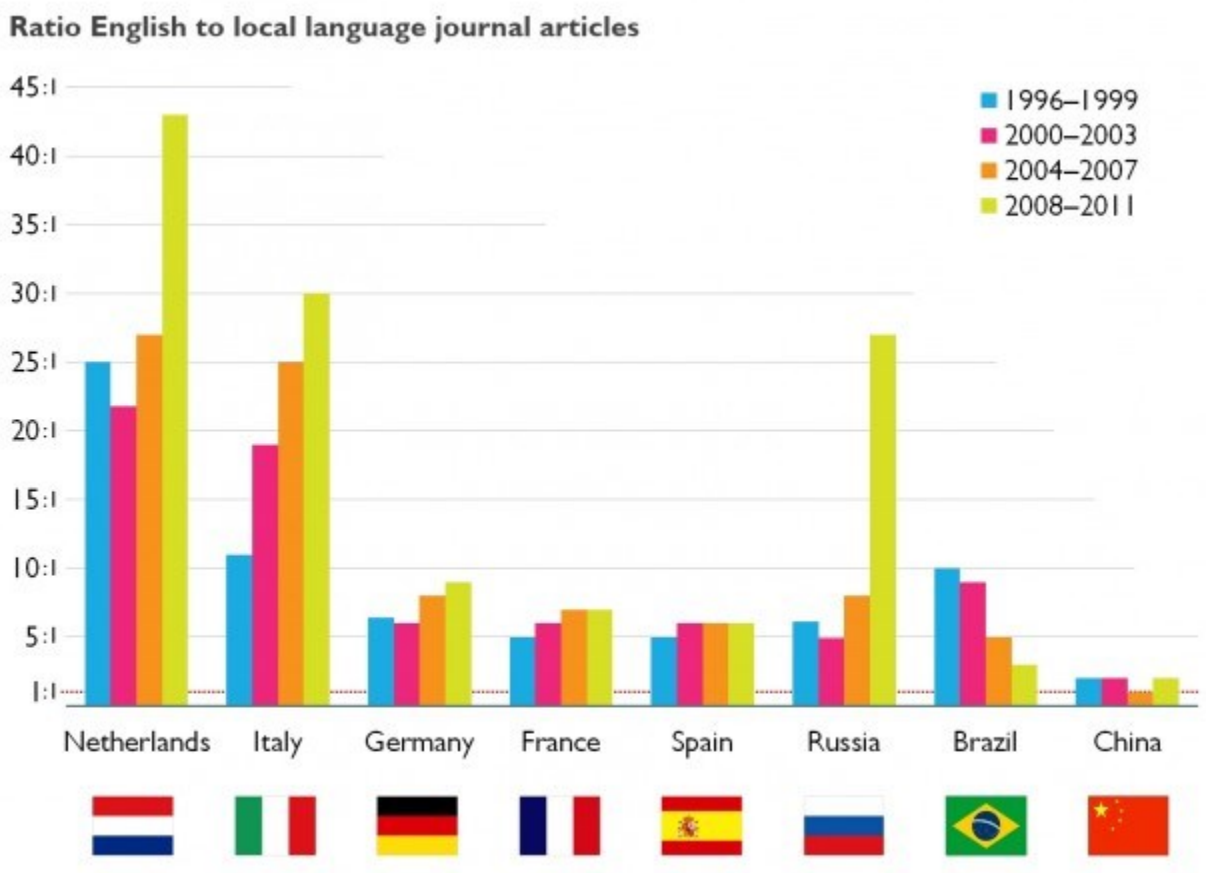


Figure 6: Ration English to local language journal articles

Source: Research Trends 2008

English language in the Czech Republic

According to EF Proficiency Index level of English language (the world's largest ranking of countries and regions by English skills) the Czech Republic displays high level of English knowledge. With its score 59.99 points, lines up to the 17th position of 32 European countries, and to the 20th position of all 88 researched countries. The Czech Republic is then placed to the second group of proficiency of English language – so called “High”. The leading score in the survey belongs to Sweden, followed by the Netherlands, Singapore and Norway – group “Very High”. The Czech Republic is followed by groups called “Moderate, Low and Very Low.” (EF 2019)

English by gender

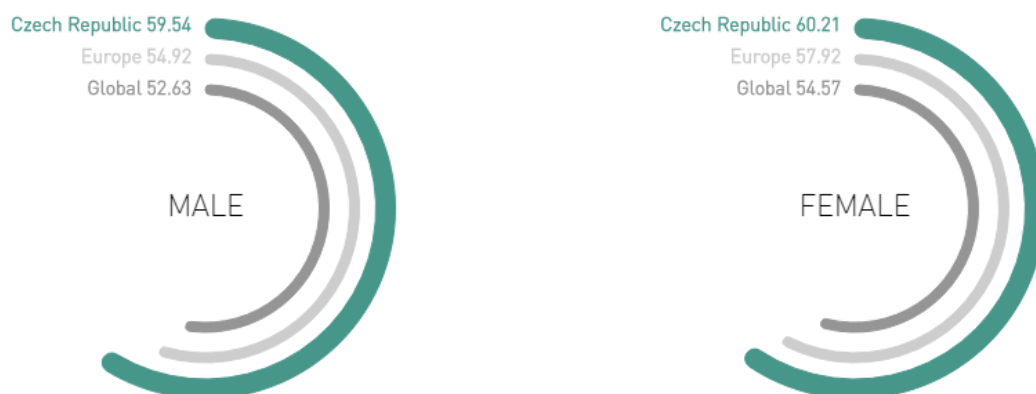


Figure 7: English in the Czech Republic by gender

Source: EF 2019

Language of biochemistry

For marketers and promoters of science can be difficult to understand all biochemistry terms. For better understanding of this issue, there are dictionaries focused on this specific scientific field – available as a book, online dictionary or an offline app.

Oxford Dictionary of Biochemistry and Molecular Biology edited by Richard Cammack, Teresa Atwood et al. provides a comprehensive survey of modern biochemistry and molecular biology. This edition includes definitions of terms from the fields of Bioin-

formatics, Biophysics, Cell Biology, Chemistry, Genetics, Immunology, Mathematics, Microbiology, Pharmacology, Systems Biology, and Toxicology. Entries are short and informative, covering details of biochemical substances and the processes in which they are involved, methods and concepts in molecular biology, and definitions of biochemical symbols and abbreviations. Each entry is accessibly written, pointing out the pitfalls where terms are often confused and providing recommended nomenclature and alternative names. (Oxford Reference 2019)

Available online is the *Biology Online Dictionary* or *Biochemistry Dictionary* app on Google Play which is an offline application that contains a wide selection of terms. (Play Google 2019)

7.1.2 Personality

Academics have a reputation for being blinkered, arrogant, patronising and intolerant of those whose specialities differ from their own. *“But for every toffee-nosed academic I’ve met, there have been plenty of humble, engaging, enthusiastic ones who love their subjects and just want to get the word out there,”* says Townson. (The Guardian 2016)

However, experts and scientists agree that promotion of science is usually based on (likewise as commercial brands) strong and interesting personalities. According to Vondráková, co-founder of foundation Neuron (which supports science in the Czech Republic), Czech scientists had not been used to present their own successes to public. *“It has been proved, that Czech scientists had started to travel and gain experience abroad, where presentation of own successes is one of the most important parts of scientific career,”* believe Vondráková. *“We offer to people, about who we know that have ambitions, media training so they for example know that they cannot use scientific jargon,”* adds for journal *MAM* James Gillies, those time the chief of CERN (The European Organization for Nuclear Research.) (MAM 2016)

Selected popular scientific personalities in the Czech Republic

Every year, Clarivate Analytics publishes chart of the most quoted scientists in the world so called – Highly Cited Researchers. In 2018, twelve Czech scientists were placed among more than 4000 world-wide scientists working in 21 different scientific disciplines. Unfortunately, category Biology and Biochemistry does not have any representative from the Czech Republic. (Clarivate Analytics 2018)

Following scientists are selected on their work to communication science to the Czech public:

- **RNDr. Jiří Grygar, CSc.** (born March 17, 1936) an astronomer, astrophysicist and popular scientist who is currently working at the Physical Institute of the Academy of Sciences of the Czech Republic. He is an important promoter of astronomy, astrophysics and connection of science and religion because of which he won over range of recognitions. The planet Grygar, discovered on October 26, 1971 was named after him. (Institute of Physics of the Czech Academy of Sciences 2019)
- **Prof. RNDr. Petr Kulhánek, CSc.** (born January 9, 1959) is a theoretical physicist who teaches at CTU faculties in Prague and popularizes astrophysics or plasma theory. (Aldeberan 2019)
- **Ing. Jan Lukačevič** (*is a Research Assistant at the Department of Space Physic, New Europe 100 Challenger. *“My mission is to utilize my skills, knowledge & experience in order to develop space technologies that both push the boundaries of human knowledge and improve daily lives of people on the Planet Earth. Working in an international environment enables me to be open-minded, curious and willing to make the most out of the differences we all have as human beings.”* Jan Lukačevič is one of the most known personalities of Czech science among young generation. His antenna, which detects electrical discharges, will soon be on a Mars missile, and will examine the lightning on the Red Planet. (Radio Wave 2018)

Selected popular scientific personalities abroad

- **Stephen Hawking** (born January 8, 1942 – died March 14, 2018), a British cosmologist, space traveller and hero. Stephen William Hawking (1942 - 2018) was the former Lucasian Professor of Mathematics at the University of Cambridge and author of *A Brief History of Time* which is an international bestseller. In 1963 Stephen was diagnosed with ALS, a form of Motor Neurone Disease, shortly after his 21st birthday. In spite of being wheelchair-bound and dependent on a computerised voice system for communication Stephen continued to combine family life (he has three children and three grandchildren) with his research into theoretical physics, in addition to an extensive program of travel and public lectures. (Stephen Hawking 2019)

- **Carl Sagan** (born November 9, 1934 – died December 20, 1996) an American Astronaut – so called "America's most effective salesman of science" by Time magazine. He spent much of his career translating technical scientific explanations into something easily digestible by the general public. As a natural teacher, Sagan educated people not only through classroom lectures but also through interviews and television shows. His 13-part TV series *Cosmos*, has been seen by over 600 million people in more than 60 countries. (Space 2018) He was successful in communicating the wonder and importance of science. His ability to capture the imagination of millions and to explain difficult concepts in understandable terms is a magnificent achievement. (Planetary Society, 2019)

Selected popular scientific personalities in biochemistry

Biochemists study the chemical processes in living organisms, including DNA, heredity and cell development. They work to understand how certain chemical reactions happen in tissues and record the effects of medicines. The aim of a biochemist is to improve our quality of life by understanding living organisms at the molecular level. This can include running laboratory experiments to develop effective medicines or going out in the field to collect cell samples from animals and plants in order to understand how genetic traits are carried. (New Scientist 2018)

- **Isaac Asimov** (born January 2, 1920 – died April 6, 1992) was an American writer and professor of biochemistry at Boston University. He was known for his works of science fiction and popular science. (Encyclopedia Britannica 2019)
- **Peggy Whitson** (born February 9, 1960) is an American biochemistry researcher, retired NASA astronaut, and former NASA Chief Astronaut. (Space 2018)
- **Gerty Cori** (born August 15, 1896 – died October 26, 1957) was a Jewish Austrian-American biochemist who in 1947 was the third woman (and the first American woman) to win the Nobel Prize in science. She became also the first woman to be awarded the Nobel Prize in Physiology or Medicine, for her role in the discovery of glycogen metabolism. (American Chemical Society 2019)

7.1.3 Women among scientists and researches

In almost all areas women face the problem of career-building and it is not different in science. The report *Gender in the Global Research Landscape* was analysing the authorship

of more than 62m peer-reviewed papers published in 27 subject areas over the past 20 years, in 11 mostly rich countries and in the European Union as a whole. (The Economist 2017)

This report found out that women are best represented in subjects related to health care – for example in nursing and psychology. Women outnumber men in several countries, including America and Britain. Less than a quarter of researchers who publish papers in the physical sciences are women. Perhaps as a consequence of this, inventors who register patents are still almost all men. In the places covered by the report, the share of patent applications by women ranges from 8% of those led in Japan to 26% in Portugal. Women are, however, making progress, even in the still male-heavy world of engineering. (The Economist 2017)

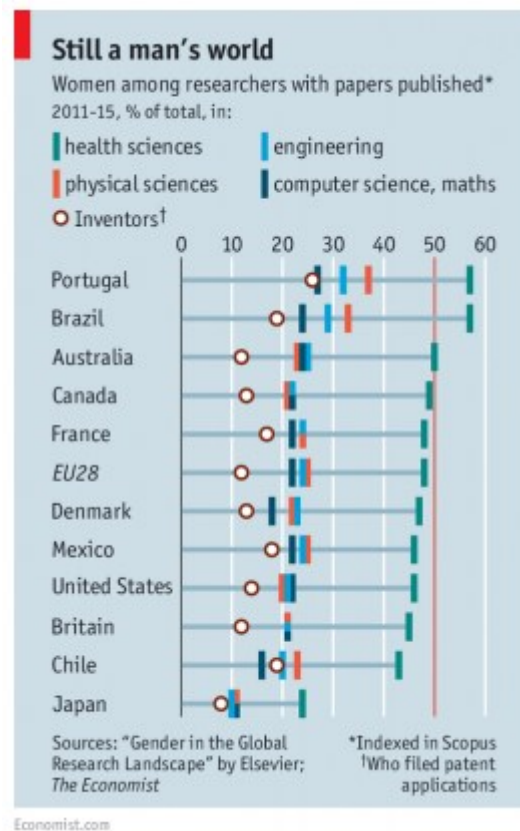


Figure 8: Still a Man's World

Source: The Economist 2017

7.1.4 Person's attitude to science

British astrophysicist James Carpenter mentions that *"science and technology are becoming more and more a part of our lives. It would not make sense for us to escape."* In The

Great Britain parents send their children to “*science camps*” and listen to TED Talks popular lectures themselves, or they are members of various associations, from serious to bizarre, such as the Association for the Recovery of Crimes.

In comparison, in the Czech Republic the popularization of science has begun flourish in the last decade and it is not yet clear whether this trend will be maintained. The later rise of mass popularization has its own advantages: the younger generation, including the generation Y, is now using technologies which are able to communicate science and scientific discoveries engagingly and interestingly. For example, James Grime, who is approaching mathematicians on YouTube. Or the authors of the two-year educational cycle “*Undistorted Science*”, which originated in cooperation with the Czech Academy of Sciences. (E15 2016)

7.1.5 Pseudoscience – Is there anything left of science?

Not everybody is excited about the popularization of science. According to some sceptics, science can become pseudoscience through popularization. Hypotheses can be distorted, discoveries interpreted in wrong way, and scientific literature can become a pulp. In addition, those academics, who decide to promote science, will not have time for their own research. The relationship between scientists can become tense, and it may happen that the scientist - promoter, after a few years finds out that he or she is no longer welcome at the academic field. (E15 2016)

7.1.6 Legal protection for the inventions (patents)

Patent is a public document issued by a competent patent office that provides legal protection for the invention for up to 20 years (if maintenance fees are paid) in the territory for which it was issued by that office. The patent owner has the right to decide who can use the patent invention for the period during which the invention is protected. In other words, patent protection means that the invention cannot be commercially manufactured, used, distributed, imported or sold to other persons without the consent of the patent owner. To obtain a patent, technical information about the invention must be made available to the public in the form of a patent application. (Moravskoslezské Inovační Centrum 2018)

With this in mind, to flourish in the scientific community, you must continue to publish papers, present at meetings, and win grants. Some scientists can become worried that if their presentation or abstract is detailed, somebody else can actually enable to make

their invention, then that disclosure may harm their chances of getting a patent. (The Washington Post 2015)

Despite this, since 2001, the number of registered trademarks has increased three-fold. At the end of 2016, a total of 39.1 million trademarks were registered worldwide. The Chinese Patent Office (SIPO) for 2016 reached the highest number of patent applications filed (more than 1.3 million). The second place was the United States, Japan third. Germany is ranked by the highest number of patents per capita. (Věda a výzkum 2017)

Equivalent patent applications by origin, 2016

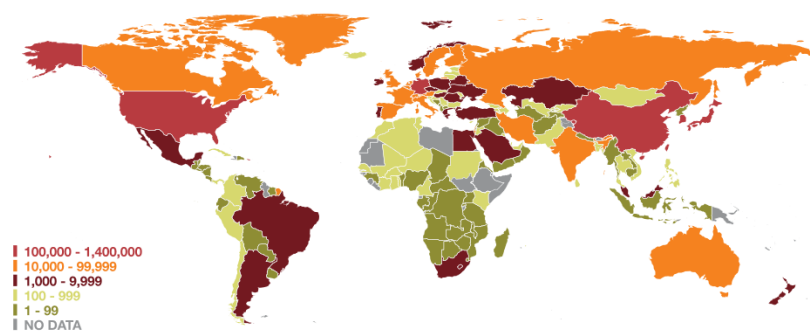


Figure 9: Patents

Source: Věda a výzkum 2017

7.1.7 Finance and funding of science

On May 2, 2018, the European Commission recommended the spending plan that includes €100 billion for research between 2021 and 2027. The proposal will be a 50 per cent increase in spending compared with the previous period but is still short of what some researchers hoped for. Robert-Jan Smits, the Commission's former director-general for research, says he anticipated a budget that included "at least €120 billion" for research. He is not alone in that opinion. "100 billion euro is a bare minimum for an . . . impactful program that will need to meet many challenges," says Kurt Deketelaere, the secretary-general of the League of European Research Universities (LERU). (The Scientist 2018) In the statement, European Commission President Jean-Claude Juncker says the proposed budget is "an opportunity to shape our future as a new, ambitious Union of 27 bound together by solidarity. With the proposal we have put forward a pragmatic plan for how to do more with less." (The Scientist 2018)

According to Czech scientists investments to the Czech scientific field are not sufficient. Lukačević says in his interview for the Radio Wave that investments to the Czech science should be ten times higher. He mentions that even Denmark, which is not a larger country than the Czech Republic, has about ten times more spending on science and research than Czechia does. *“But recently, I read that the Danes have a high so-called “scientific performance”. This means that for a certain amount of money invested they have significantly more patents, published articles in impact in journals, and in short - science has reached a significantly higher level. This is because the finances are much better re-distributed there.”* (Radio Wave 2018)

In 2015, the Czech news was full of article titles which were announcing that the Czech Republic has poured money into the promotion of science and only half of the amount was left for science itself. For the promotion and popularization, the ministry shared CZK 3,7 bn between 2009 and 2014, while only CZK 1,4 bn was used to support the use of research and development results in the commercial sphere. That led to concerns, that there is not going to be enough of qualified vacancies which can cause the degradation of research potential of the Czech Republic and its competitiveness. (Novinky.cz 2015)

7.1.8 Misinterpretation and exaggeration

Scientists are struggling with the misinterpretation and exaggeration of their projects. *“Recently, I have been struggling with the media outlets in which I appear,”* says Lukačević. *“I have to admit: it's bad, really bad. Put yourself into my shoes: I spend my spare time writing various social networking interests, participating in various panel discussions, before or after work. I tried to work with the media to know more about science and space research, and it's just a pity,”* he continues. *“Why? Fuzzy quotes, factual inaccuracies about my work and other ailments. Who will you benefit from? Please, it is not need it at all! Do you want to fail to realize that I was a member of a development team that focuses on Mars? Do I have to be the leader of this team?”*

Scientists are a diverse group, but what is connecting them, is curiosity and an effort to find the truth. They are more sensitive what people honestly do think about them, even if somebody tries to make them look better. *“If you want to help science and scientists, do exaggerate, do not make from scientist something that they are not. We are people who do their job, and every such unfortunate outing is doing badly both in the workplace*

and in the head. Verify information, ask questions. The key is mutual dialogue and if you really want to inform people, it costs energy and time,” Lukačević concludes. (Jan Lukačević Facebook 2018)

7.2 An Analysis of Marketing Communication by NASA

As an example of a successful marketing communication of science discipline, it can be mentioned the activities of the American National Aviation and Space Agency (NASA). NASA has on Facebook more than 20 million fans, and on the Instagram and Twitter almost 30 million followers. It is active on Snapchat too, to which it addresses younger users. The NASA audience is pleased by the content in which very often reflects the current scientific or social issues, but it still remains professional. (MAM 2016)

It shows real images and videos from space, running researches and illustrations of how different physical phenomena work. Current and popular content is a pillar of the NASA communications. The marketing specialists and scientists working for NASA publish articles about real robots, which it uses or real planets that have two suns like the planet Tatooine from Star Wars movies. Black Friday Shopping NASA has renamed as Black Hole Friday and for five years already uses the shopping spree to explain interests and issues of black holes. (NASA 2019)

7.2.1 Marketing Communication Specialist at NASA - Veronica McGregor

The person who manages the social media team at NASA is Veronica McGregor. *“At NASA’s Jet Propulsion Laboratory, I lead an award-winning team producing news, videos and social media to keep the world engaged with space missions studying Earth, the planets, asteroids, comets, stars and galaxies,”* says McGregor on her LinkedIn. (LinkedIn 2019)

With a background in video production at CNN, she joined NASA-JPL in 2001 to lead the news team. In 2008, she launched the space agency into social media by starting the agency’s first accounts on Twitter, Facebook and YouTube. *“It’s a busy universe-- we produce over 400 news releases and articles per year, plus dozens of multimedia and interactive products. In social media, we earn millions of impressions per month with engaging content. In 2018, we won a Creative Art Emmy Award for Outstanding Original Inter-*

active program for our work on the Cassini Grand Finale including a two-camera live streamed 360-degree broadcast,” mentions McGregor. (LinkedIn 2019)

NASA’s first social media accounts

In 2008 McGregor and her team was searching for something what was available and free, because as you may know, NASA is government founded organization and team for promotion consists only of 2-3 people at each NASA’s centre. What was also seen as a problem was the lack of feedback from traditional news media such as newspaper and television. McGregor says, in an interview for the *Social Media Minute*, that almost every time they had to hope that it would be written about the each science story. In that time, Twitter seemed to be the right solution. She founded a Twitter account called *Mars Phoenix*. (Social Media Minute 2016)

The Phoenix mission was the first chosen for *NASA’s Scout program*, an initiative for smaller, lower-cost, competed spacecraft. Named for the resilient mythological bird, Phoenix used a lander that was intended for use by 2001’s Mars Surveyor lander prior to its cancellation. It also carried a complex suite of instruments that was improved by variations of those that flew on the lost Mars Polar Lander. (Mars NASA 2019)

How important is to know your audience

With the social media, NASA is able to put out all the information about its missions and people get it exactly where they want to find it - in their newsfeeds. Thanks to the social media, NASA could learn a lot about its audience. They learnt why public love what they are doing, why people love space exploration, but they also have realized that people know very little about it. They set up to an explanation of what each mission is doing on daily basic and they got many questions. Seeing those questions made them to change their other products – they could see where they had missed informing the public about for example the cameras of the spacecraft, etc. *“We were able use the information, which we were getting back from the audience, and formed better products,”* mentioned McGregor. (Social Media Minute 2016)

As such an example well used feedback and communications McGregor states an *Asteroid Watch*, profile account which is determining how close the asteroids may pass the Earth. This account was mainly set up to let people know, that something is coming close to the Earth – which is happening quite frequently. The account gained one million follow-

ers in a month, but also the panic ensues. The account has been followed mainly by people afraid of asteroids, and not people curious about space exploration. That was the moment when McGregor has realized that you have to know your audience and the audience is not same across all NASA accounts. They had to change the tone of the account and make sure people have felt safe. She also adds that she looked at the audience as at those, who she can teach about space exploration. *“It opens new doors,”* she concludes. (Social Media Minute 2016)

7.2.2 Chief of Digital Communications at NASA – John Yembrick

Yembrick mentions, on his LinkedIn profile, that as NASA’s first digital communications director, he takes pride in advocating away from traditional communications methods towards digital storytelling. *“It’s the single most important thing we’re doing, reaching more people directly than ever before,”* Yembrick continues. (LinkedIn 2019)

There is a transformation in the way we communicate as species, and NASA leads with some of the most compelling content in the world. Just as radio, television, and other media expanded the definition of the press. *“I believe that direct engagement with the public, via digital communications, is the future. I take great pride in having torn down previous silos to build the NASA’s digital team,”* he concludes. (LinkedIn 2019)

NASA as a brand

Even though NASA is the government organization, it thinks like, acts like, behaves like and is a brand. *“We built a strong community”* says Yembrick. NASA’s social media content informs people of little-known spin off technologies. The types of content NASA shares, is focused on how it affects you and your life and at the same time, it hopes, it inspires young people to study science. *“It does not just connect people through the screens, but real human beings are being involved,”* mentions Yembrick. NASA’s Social Program takes the online experience to offline – anyone who is active on social media can apply to attend some NASA event – for example launch. (Social Business Engine 2015)

Crisis communication

Crisis management is something that is almost everyday thing in NASA. *“Crisis communication is important element on social, and we have crisis plans for everything. We have prescribed language, if we have a bad day,”* mentions Yembrick. For example, if a space-

craft would be damaged, they would take the content and repackage it for socials. According to Yembrick, in such cases, openness and getting the information published as fast and accurately as possible, is the key aspect. (Social Business Engine 2015)

7.2.3 Deputy Social Media Manager at NASA – Jason Townsend

During his NASA career, Jason has focused on covering the agency's people, missions and programs across a digital landscape of over 500 social media accounts on 18 platforms. Working with an in-house social media team, he has been at the forefront of communicating NASA's story to a community of followers grown from 12 million in 2012 to 64 million strong in 2017. Jason is regularly called on as an expert in the use of social media, advising agency leadership on social media best practices, policy, and upcoming social media activities. (LinkedIn 2019)

Social media strategy and platforms used

Townsend said, NASA leans heavily on social media management platform Sprinklr to post an average of six to eight times daily on Facebook and LinkedIn and tweet 10 to 12 times per day, except during live events - such as rocket launches, space walks and question-and-answer sessions with experts - when that figure can go as high as 25 tweets daily. The agency also aims to post one photo or video to Instagram each day, as well as two to three Stories weekly on Snapchat, Instagram and Facebook, each with roughly six to 10 elements. Townsend said NASA's posts typically reach tens of millions of people daily across all of its platforms, generating tens of thousands of interactions (comments, replies, messages), as well as hundreds of thousands of likes per day. *"If we can find that curiosity in every person out there and pull it out of them, then we can really engage with an audience that is interested in what we're talking about,"* said Townsend. (Adweek 2018)

7.2.4 Multimedia at NASA, art and film – Bert Ulrich

While NASA has had involvement with movies like *Men in Black 3*, *Armageddon*, and the *Transformers* series, there are also collaborations which are a little more in-depth as for example *Tommorrowland*. *"It was one of those projects that we saw from state to finish. The producers came to us at the very outset... they wanted to have an element of NASA in the movie,"* Ulrich said for a magazine *PlayerOne*. (PlayerOne 2016)

NASA and the expression by art

In 1962 NASA began commissioning artists to document and capture on canvas the drama of its missions. The artists were supposed to show that important events can be as well as interpreted by artists and to give a unique insight into significant aspects of our history-making advances into space. An artistic record of this nation's program of space exploration should have great value for future generations and may make a significant contribution to the history of American art. (NASA 2019)

In the 1990s the program was turned over to Bert Ulrich, who was tasked to embrace new art forms. Works included video art by Nam June Paik, an Ode to NASA by Ray Bradbury, and photography by Annie Leibovitz. Patti LaBelle performed a song commissioned by NASA that would eventually be nominated for a Grammy. The song "Way Up There" became an elegy for the lost crew of space shuttle Columbia. Newly commissioned works started to attract the attention of museums like the Pompidou Center in Paris; the Hirshhorn Museum and the National Museum of Women in the Arts in Washington, D.C.; and the Guggenheim, New York, N.Y.; which all exhibited NASA commissioned works. As Lester Cooke, one of the NASA art program's original founders, wrote *"I hope that future generations will realize that we have not only scientists and engineers capable of shaping the destiny of our age, but also artists worthy to keep them company."* (NASA 2019)

7.3 Science on Social Media (Internet presence)

Nowadays, almost 45 000 scientists around the world use Twitter. Social media allows people from across the globe to engage; keep up with new findings, tools, and cutting-edge trends, sometimes months before they appear in print. Receive almost immediate feedback on their work, and find new collaborators. Having a presence on social media may even lead to opportunities, exposure, and impact beyond scientific circles. (Journals 2017)

Despite benefits, there is also a dark side. Social media often lacks the careful editing, feedback, and revision that characterizes the rest of the academic work. As a consequence, many people post things they wish they had not. When you tweet, post in a public Facebook group, or write a blog post, that information is there for the world to see and criticize. Sometimes posts generate positive, productive responses—but other times, the responses can be quite negative and even vicious. (Science Mag 2018)

Scientist, such as Neil A. Lewis, Jay J. Van Bavel, Leah H. Somerville, June Gruber, come up with a strategies which can help other scientists to maximize the benefits and minimize the cost:

- **Be intentional.** Social media platforms allow you to reach both intended and unintended audiences. Assume that any message you write could go viral, and think about how it may be received by multiple audiences with different viewpoints. (Science Mag 2018)
- **Build a strong network.** The key to social media success is curating the right list of accounts to follow. Craft a list of scientists, labs, societies, academic departments, companies, journals, and journalists to generate a high-quality feed of interesting news and updates. An easy way to start is by following current members of your scientific circles.
- **Remember that posts last forever.** Before you post anything, ask yourself, “What are the odds that I might regret this?” (Science Mag 2018)
- **Be charitable.** If you find yourself interpreting a negative tone in another person’s post, consider whether it could be read differently. Posts are only words, after all, and miss the rich nonverbal information—such as facial expressions, pitch, and body language—that we gain when interacting face-to-face. Just as you want others to assume the best in you, extend that same courtesy when reading others posts. (Science Mag 2018)
- **Let the haters hate.** It turns out that they do a lot of hating on social media. The advice is to look at criticisms and take seriously those that are constructive, but try to steer clear of anyone who seems more concerned with hating than creating. (Science Mag 2018)

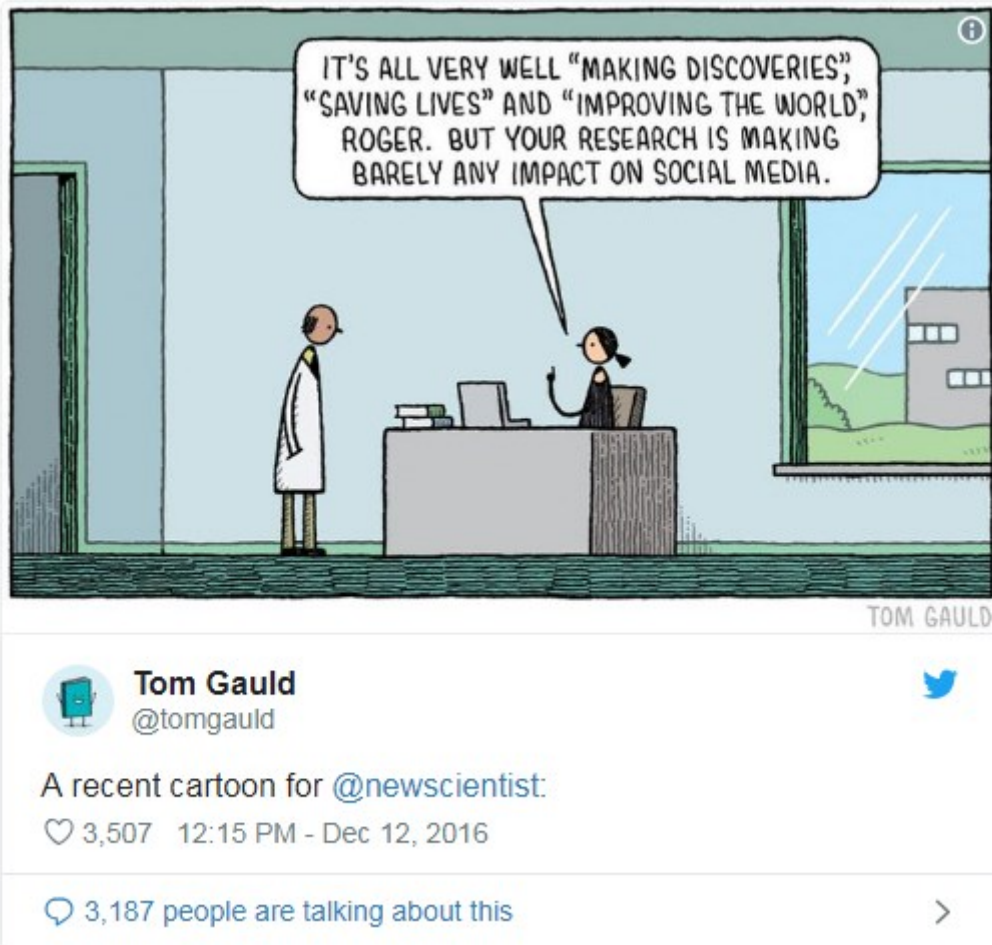


Figure 10: Cartoon

Source: Twitter Tom Gauld 2016

7.3.1 Popular scientific platforms

Beside the current traditional platforms, such usually are Facebook, Twitter and Instagram, scientists and scientific fans can find their colleagues and the scientific community on platforms such as:

ResearchGate is a social network specially designed for the scientific community. The platform is designed to enable users to communicate and collaborate with each other and to provide free access to scientific literature. *ResearchGate* offers the creation of a personal profile, membership in interest groups, the use of a job exchange specializing in positions for scientists and academics. The platform also provides information on current science-based events and provides access to scientific databases. (ResearchGate 2019)

LabRoots is a social networking service (founded in 2008) focused on all things scientific, medical and academic. It is a source for scientific news, virtual conferences and webinars. Often is considered as a *LinkedIn for biomedical scientists*. (LabRoots 2019)

7.3.2 Popular hashtags in science

Hashtags are essentially Instagram's sorting process. With around 95 million photos posted on Instagram every day, it's difficult for Instagram to efficiently deliver the right content to the right people. Hashtags help your post get discovered by viewers most interested in seeing it. (Hubspot 2019)

Essentially, hashtags are a better way to categorize your posts on your social media platforms such as previously mentioned Instagram but also on Twitter, Facebook, etc. Hashtags help you reach the target audience, and more importantly, they help your target audience find you. These users are more likely to engage with your post because your post is exactly what they wanted.

In following Figure 11 are shown the most popular hashtags and top influencers connected with the hashtag *#science*, such as *#space*, *#tech*, *#news* and others. *@NASA* lines up in the leading position among the most popular Influencers.

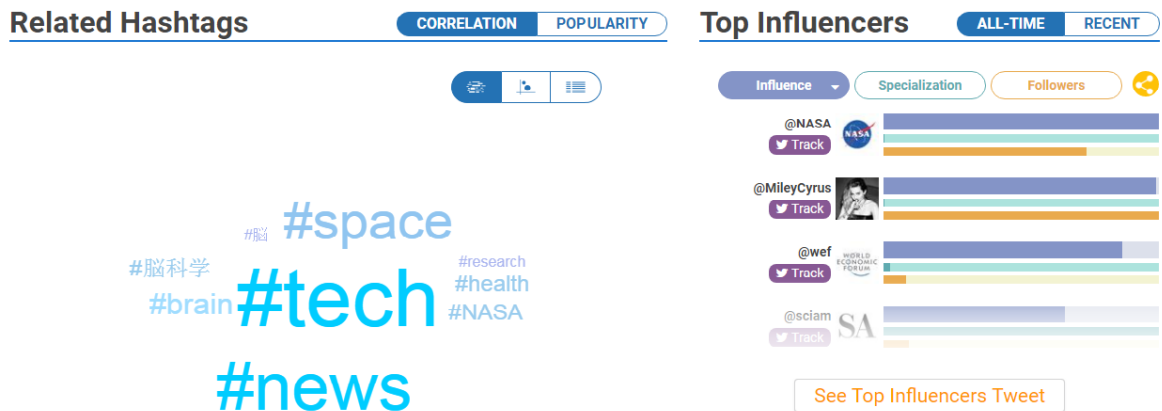


Figure 11: Hashtags

Source: Hashtagify 2019

In next figure 12 are specified the top liked tags along with hashtag #biochemistry according to Tagmentor. Scientists interested in increasing their reach, can simply copy and paste #biochemistry hashtags from mentioned webpage in your Instagram posts and comments for increasing chances to get more likes on instagram posts. (Tagmentor 2019)

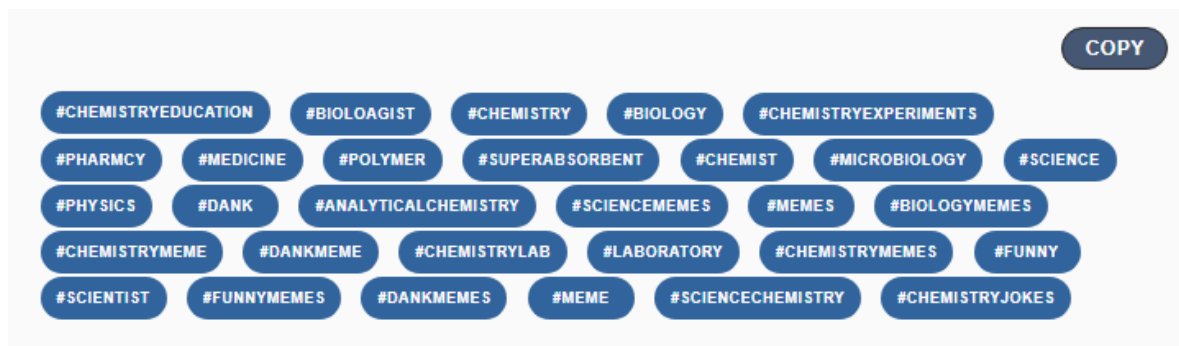


Figure 12: Top liked Hahtags with post #biochemistry

Source: Tagmentor 2019

7.3.3 Popular influencers in science

Influencer marketing is a relationship between a brand and an influencer. The influencer promotes the brand's products or services through various media outlets such can be Instagram, YouTube or others. Influencers must be trusted figures within a niche community and retain a loyal following. In addition, they typically possess knowledge or experience about what they are advertising. (Forbes 2018)

Notably, the monetary value of an influencer is typically calculated by the size of their social following as well as the platform they are using. On Instagram, industry experts suggest a price point of \$1,000 per 100,000 followers. This price should be adjusted further depending on the reach and relevance of your influencer. On YouTube, a price point of \$100 per 1,000 views is standard. (Digital Marketing Institute 2019)

- **Sasha Weiditch (@Scigirlsash)** is a PhD candidate, biochemistry research, science communicator and digital content creator. *“I love the everyday uniqueness of being in scientific research, the constant opportunity to learn and the ability of one’s work to have an impact on people for the better. My goal is to promote science to girls, by sharing my experiences and experiences engaging with excellent female scientists, which demonstrate that science is cool and science is for everyone!”* (Scigirlsash 2019) On her Instagram profile she is followed by almost six thousand people. Weiditch tries through pictures, videos and Instagram stories promote how amazing the science can be. She is posting stories from laboratories, about her PhD studies and life of a scientist.
- **Martijn (@Story.of.a.scientist)** is a science communication officer at Hasselt University in Belgium. Martijn is giving talks, organizes events to spreading the word of science on social media. *„I love Instagram for its visual aspects and awesome science community“*. Martijn is followed on his Instagram account by more than 11 thousand people. (Story of a Scientist 2019)
- **New Scientist (@newscientist)** it is *“the best place to find out what’s new in science – and why it matters.”* Followed by 3.41 million people on Twitter and more than 72 thousand people on Instagram. Using interesting pictures and curious titles about space, technology, environment and others. Engages people emotions. (New Scientist 2019)

7.3.4 Popularization of science through music and movies

Music is one of the most inspiring art forms and when a popular artists or bands repeatedly express the importance of science it may leave an impact. How much of an impact came apparent when people all over the world went out on the streets to protest against the ignorance of scientific evidence at *The March for Science*.

This event is organized by the March for Science champions who robustly funded and publicly communicated science as a pillar of human freedom and prosperity. “*We unite as a diverse, nonpartisan group to call for science that upholds the common good, and for political leaders and policymakers to enact evidence-based policies in the public interest,*” is said on the official website March for Science. Especially the Trump and May governments in the US and UK respectively have repeatedly denounced scientific fact when it comes to climate change and other important issues. (March for Science 2019)

Numerous signs at the *March for Science* showed lyrics of popular British band Enter Shikari songs such as *Arguing with Thermometers* or *Never Let Go of the Microscope*. An example of how musicians can use their platform to change society and spread a positive message. (Genre Is Dead. 2017)



[Zobrazit víc na Instagramu](#)



104 To se mi líbí
sparkoftheatoms

Act with persistence. This is real and we cannot afford to fail.
#entershikari #music #lyrics #earthday #savetheplanet #marchforscience

Přidejte komentář...



Figure 13: Instagram post

Source: Instagram Account “Sparkoftheatoms”

In the case of Enter Shikari, which was selected for this thesis, there is a lot of frustration throughout the whole album and each song comes at it from a different angle but the number one priority has always been to make positive music that is full of hope and to try and fortify people's strength and resilience. *Mindsweep* is a name that was given by the band to the situations that occur – one example would be climate change. The Tories (the British politician party) have scrapped subsidies for solar power which you cannot really argue for. There is no sane, scientific reason behind that decision – we need as much renewable energy as possible. So mindsweeping is where they're trying to, at best, disparage some sort of new direction or philosophy and, at worst, they're just outright blocking it. Just sweeping one's mind of hope and possibilities. *"The number one priority has always been to make positive music that's full of hope. Activism has always been something that's been really important to us as a band,"* said Reynolds. (Big Issue North 2016)

Furthermore, science can be promoted as well as through popular movies and TV series as is for example *Who's Who in Mycology*. This short movie was directed by the Czech director living in New York - Marie Dvořáková. Dvořáková is the second Czech person in history who has won a prestige American award Oscar by the Academy of Motion Picture Arts and Sciences. She managed to connect something such basic as mould with a 15 minutes story of Tony, a young trombone player, spends an adventurous night trying to open an impossible bottle of wine. An unconscious girl, a crooked bookcase and some mold get in his way, turning his world upside down. When the night is over he is forced to commit the ultimate act of courage. Institute of Microbiology of the Czech Academy of Sciences provided the filming of with the petri dish with the moulds and scientific consulands from the academy were invited to give an expert advice. (Who's Who in Mycology 2019)

Dvořáková suggests that initially, it came into being thanks to the Sloan Foundation's invitation, which began to support the interconnection of scientists and filmmakers. *"Even getting finances is on the shoulders of students, not just script and directing,"* maintains Dvořáková. (Český Rozhlas Vltava 2018) Mentioned foundation financially supports research and education in science, technology, engineering, mathematics and economics. It is a non-profit grantmaking institution that supports high quality, impartial research. It fos-

ters a robust, diverse scientific workforce it is supposed to strengthen public understanding and engagement with science. (Alfred P. Sloan Foundation 2019)

AFO – Academia Film Olomouc

Since 1966, the international festival of science documentary films has been organized by Palacký University in Olomouc. The festival is focused on progressive factual films and documentary films, discussions and lectures exploring various hot topics. From research of distant planets, Earth's oceans and global warming through the development of robotics and artificial intelligence all the way to the position of women in science and society or life online and addictions. Its missions and objectives including, but not limited to, are to present the general public with science, research and technology as fascinating and vitally important fields of human activity and inseparable parts of our culture and society, to link the academic sphere and scientific institutions with experts from the TV and film industry and other cultural institutions.

7.3.5 Podcasting

Podcast is defined as “a radio on demand”. It is an audio program, which is prerecorded and published on the website and available for download on personal computers or mobile devices to be listen when the listener wishes. Compared to text and video content, audio content is more accessible for users. (Ecmetrics 2019) The advantages are that the podcasts can be spread quickly, are personal, up-to-date and can be used optimally in the pre-and post-release for distribution. When the podcasts is published on platforms such as iTunes and Stitcher, the content is exposed to thousands of potential listeners for free. Recording a podcast is inexpensive and quick to produce. Basu mentions, that during the past few years popularity of podcasts is increasing but there is still plenty of room for more shows. “*Depending on your niche or topic, you may have the advantage of facing very little competition.*” (Entrepreneur 2019)

7.4 When scientist presents (Public relations and Personal selling)

Communication through the public events, and at the same time highlighting various features of the product to convince the public that it will only add value, is another part of promotional mix. As an ideal result of this marketing technique, is to serve with information both - the source and the public interest. Among such events, in the area of science, we can consider for instance science awards and scientific conferences.

7.4.1 Scientific awards

Winning the scientific award can without doubt made a huge difference when applying for promotions and research grants. Winning the prize, or even to be nominated is a badge that says, the scientist is externally recognized as having achieved something in the community. It is something which distinguish scientist against other grant applications. Competing for awards can create an opportunities to receive useful feedback about person's work and can help him or her to build a support base for the future.

Beyond the monetary value which usually came with the prize, laureates are guaranteed a stream of speaking conferences and other scientific events. Among the most lucrative scientific (chemistry and biochemistry) awards are ranked:

- **Nobel Prize** - *"prizes to those who, during the preceding year, have conferred the greatest benefit to humankind"*. (Nobel 1985) The event is hosted every year in Sweden and Norway.
- **Breakthrough Prize** – among others the prizes are sponsored by Priscilla Chan and Mark Zuckerberg. Laureates receive \$3 million each in prize money. They attend a televised award ceremony designed to celebrate their achievements and inspire the next generation of scientists. As part of the ceremony schedule, they also engage in a program of lectures and discussions. (Breakthrough Prize 2019)

In the Czech Republic, probably the most significant scientific awards are:

- **Česká hlava** - have been awarded since 2002. It is considered as the most prestige award which the scientist can achieve in the Czech Republic. The laureates are awarded with prize money as well. In 2018, the laureates gained almost 1.5 million crowns. (Česká hlava 2019)
- **Neuron – Benevolent Fund for Support of Science** – which has five different subcategories and is choosing the best scientist under 33 years old, best research

discovery and contribution to science. Further, it recognize the best two high-school science teachers and last but not least *Science Popularization Award* which recognizes scientists who dedicate their time and energy to popularizing science. (Neuron 2019)

7.4.2 Scientific conferences

Scientific conferences or also so called academic conferences are opportunities for scientists and researchers to present and discuss their work. Those events consist of various presentations and are usually followed by discussions. Nowadays, among the most popular conferences popularizing, beside others, scientific topics can be mentioned *TED Talks* or *Pecha Kucha Nights*.

Following list of events is probably the most important and popular for the topic of project part of this thesis:

- **Coloss – Honey Bee Research Association** (<https://coloss.org/>)
- **Apimondia – International Federation of Beekeepers Associations** (<https://www.apimondia.com/en>)
- **Plant Nitric Oxide International Meeting** (<https://colloque.inra.fr/pno2018nice/>)
- **Meeting of Biochemists and Molecular Biologists in the Czech Republic** (<http://www.sci.muni.cz/orion/Setkani/Setkani19/index.htm>)
- **Interdisciplinary Meeting of Young Biologists, Biochemists and Chemists in the Czech Republic** (<http://www.mezioborovesetkani.cz/>)

7.5 Advertising science

During research was found out, that there is not so many social marketing campaigns which would be focused on promotion of science or increasing awareness of the scientific organizations. At least, two campaign can be mentioned - Campaign Feed a Bee, which can be taken as an inspiration for the project part of this thesis, and Science World Campaigns which are advertising science in an interesting and unusual way.

Feed a Bee

Feed a Bee is an USA marketing campaign focused on planting pollinator forage across the nation with the help of communities, individuals and organizational partners. It is an initiative of the Byer Bee Care Program, and the campaign was launched in 2015. Thanks to

Feed a Bee, Bayer will distribute at least 280,000 free wildflower seed packets to anyone who wants to plant them. People can join this initiative by visiting Bayer's microsite and requesting a free packet of wildflower seeds to plant on their own or by asking the Feed a Bee initiative to plant on their behalf. (Feed a Bee 2019)

This campaign is supported by animated video with a catching music. Feed a Bee video has almost 3000 thousand views on YouTube. The campaign is accompanied by the *Bayer Young Beekeeper Award* which recognizes students ages 12-18 for their efforts in pollinator health and community leadership. The award honours young leaders who have created a unique project to support honey bees either individually or in tandem with their school or a community organization. (Feed a Bee 2019)



Figure 14: Feed a Bee logo

Source: Feed a Bee

Science World ad campaigns

Science World has produced a number of ads for *We Can Explain* and *Now you Know* campaigns. Goals of these campaigns was not only to increase awareness of the organization and introduce the "personality" to the community, but also to support mission of engaging the general public with science in a way that is both thought-provoking and fun.



Figure 15: We can explain

Source: Science World

8 PRIMARY DATA RESEARCH

As was found out in the theoretical part, before starting the promotion of science, there are few basic questions which have to be answered. This interview with Mgr. Martina Janků is clarifying these questions about the promotion of scientific project focused on biochemistry, and it is bringing more details to this issue. The main purpose of the promotion is, as Mrs Janků says, to *“support some meaningful project, which can help something or someone”*. To the question - *Why you want to communicate it to the public?* - she answered that *“science is beautiful and it would be great if more of it was talked about. Science is here for us, for people, to help us, make our lives easier and better”*. And it goes hand in hand with the desire achievement of the promotion - to introduce the public with an example of what science can currently address and what impact it may leave (also for a public) and even make some reflection on what is happening, though we do not hear about it daily from the media. The other reason she mentions is that it would be great if she could get feedback from people working in this area. *“For example, for my research on a honeybee immune system, any comment from a beekeeper, who has a totally different perspective than I do, can be very beneficial”*, she adds.

The target group is a crucial for any marketing plan. To whom exactly is the information intended and what target audience is the promotion focused on, were the other part of the interview. Even though the results of the project are primarily intended for the scientific community, Mrs Janků says that she would be happy, if this current issue was conveyed in a suitable form to the practitioners, for instance beekeepers, farmers and anyone interested, whether in our region or in our country in general. During the planning of the promotion, we have to have in mind that the expenses for the promotion should be as low as possible. The limitations were also mentioned during the interview. The promotion should not harm the nature of the science. *“To take it down to its value, in order to just accomplish something”*, says Mrs Janků.

As was found out, the language of science is nowadays English. Mrs Janků mentions that her knowledge of English is not top-notch, but it is such, she is able to communicate and work in a laboratory abroad. It cleared out the potential of broadening the promotion also abroad. To the questions: *Do you have some feelings that gender is important in science?* Do you have or have you ever had same disadvantages just because you are a woman? She answers that: *“The balance of men and women in science is still a little trouble. Women in science are not currently significantly oppressed, but I think they are still*

challenging, and have to face the prejudice that women do not belong to science. I also think they have a harder time in terms of starting a family, if you get out of the science for a while, in can be after a year or so at a completely different level.”

The interview concludes with Mrs Janků’s opinion on if the science is nowadays promoted at sufficient level. She answered positively, but she added that there is always something to improve. From this answer follows, that there is potential for improvement of promotion science focused on biochemistry.

The complete transcription of the interview with Mrs Janků is seen in appendix II.

9 SUMMARY OF THE ANALYTICAL PART

The analytical part has provided the necessary information for the project part of this thesis. Qualitative research was carried out. The secondary data research found out the barriers in communication of science, which is important to have in mind during planning promotional mix of scientific project. The secondary data research gave the opinions and advices of ones of the best marketing specialists working in scientific field - especially for NASA, which is nowadays considered as an example of a successful marketing communication of science. Then the research was focused on the internet presence and the remaining parts of the promotional mix.

Furthermore, the primary data research followed. This research was based on an interview with Mgr. Martina Janků, PhD student of Biochemistry at the Faculty of Science at Palacký University in Olomouc, the person who is in charge of the biochemistry project. This part, however, helped to create some background and a basis to better understanding of the objectives and the chosen target group.

10 ANSWERING THE RESEARCH QUESTIONS

The thesis found out that science can be promoted many different ways. According to marketing specialists working for NASA, having nowadays many different social accounts on social media is the key. Building science topics and issues as brands, which connect people, and create different target groups, is another useful tool how to make people interested in science. Using scientific matters as parts of scripts of movies, can give a unique insight into significant aspects of our history-making advances, besides it can be an opportunity for artists to obtain financial foundation for their projects. Further, collaboration with musicians can be helpful as well, since musicians can use their platform to change society and spread the issue.

This thesis discussed many barriers which can affect the promotion of science. It is difficult to give an answer if it is science promoted up to a sufficient level. According to Czech scientists, money for science researches in the Czech Republic is not distributed rightly. In the 2015, Czech news were announcing that the Czech Republic has poured money into the promotion of science, and only half of the amount was left for science itself. That led to concerns of degradation of research potential of the Czech Republic and its competitiveness, which itself is not a good reflection of science promotion. Besides, Mgr. Martina Janků in her interview says that even though there is more options how to promote science nowadays, the situation can always be better.

11 MAIN OUTCOMES FOR THE PROJECT PART

The analytical part has clarified the target group which is going to be focused mainly on beekeepers and farmers, public interested in this topic, in Olomouc region, or possibly in our country. Then the budget was set. The expenses of the promotion should be as low as possible. Desired achievements of the promotion are also to introduce the public of what science can currently address and what impact it may have. Further, to make some reflection on what is currently happening, though we do not hear about it daily from the media. The limitations were mentioned. The promotion should not decrease the value of science in order to just accomplish something. To harm it's nature.

Furthermore, the analytical part suggested interesting ways of promotion of science. It came up with the ideas to take the opportunity of influencers or to promote the science with an art, through music or movies. Different social media channels were suggested and diverse scientific conferences focusing on biochemistry were mentioned. Advertising science examples were shown. This created the necessary basic and inspiration for the project part.

III. PROJECT

12 PROJECT BACKGROUND AND INTRODUCTION

In this part, theoretical knowledge as well as previous analysis, evaluation and information gathered will be used to create promotion of scientific project. Scientific project, which has been chosen for this thesis is called *The involvement of nitric oxide in signalling and regulation mechanisms of defence response of plants and in the immune system of honey bees* by Mgr. Martina Janků, PhD student of Biochemistry at Palacký University Olomouc.

Me, as the marketer, and Mgr. Martina Janků as the scientist, are going to find a way how to make her project visible for the target group. We have been working on this project since April 2018 (from the marketing point of view), and we have realized, there are many challenges we both are going to be confronted with. For me, the understanding the biochemist terms, relations and the whole issue has been difficult, and often, when I came with some ideas, Mgr. Janků answer was: “... *but I cannot skew the essence of the project*” – which had had been the core issue of our collaboration. The secondary research, and its chapters about barriers in communication of science, should help me to avoid this situation happening again, during creation of the promotional mix.

Introduction of Mgr. Martina Janků: *“I am a PhD student of Biochemistry at the Faculty of Science at Palacký University in Olomouc. My scientific work, since my bachelor degree, has been focused on the knowledge and understanding of the interdependence of the mechanisms of defence reactions of plants. In the framework of my dissertation thesis, I am focused on defence response in the study of signal and regulatory role of reactive forms of oxygen and nitrogen. In addition to plant immunity, my scientific research has been extended to the issue of bee’s immune responses, where the role of a small but important nitric oxide molecule has not yet been explored.”*

Introduction of the scientific project: The aim of the project is to investigate nitrate oxide involvement in signalling and regulatory mechanisms of plant defence responses and in the honeybee’s immune system. Nitric oxide (NO) as a signal molecule plays an important role in both - plant defence and invertebrate reactions. During Mrs Janků research internship at the University of Verona, she is learning the modern sensory methods for analysing NO levels in both - the molecular and cellular levels. The project also aims to help clarify the involvement of NO in the bee immune system. The results obtained so far show a significant role for NO in the activation of the bee immune system. This scientific area is still very little explored, and the results obtained can have a significant social im-

pact. Achieved outputs of the project, which include the introduction of new methodological approaches, will benefit the further research work of the scientific group and in addition, the project will strengthen the cooperation with one of the best European laboratories. Clarification of NO signalling responses to the project can contribute to the potential use of substances that increase resistance to the protection of major crops against malignant microbial infections, which is very beneficial worldwide due to the growing problem of food scarcity. The project will also help clarify the involvement of NO in the bee immune system. The findings thus gained a new perspective on the signalling pathway involved in the bee's immune response, an insect that is of particular importance to humans.

13 MARKETING STRATEGY

Marketing strategy presents all planned steps from creating promotion, implementation, budgeting and final evaluation. This includes different processes and use of communication tools as well as description of risks and limits. It will be based on previous findings from the analysis, hypothesis introduced before and other theoretical findings.

13.1 Segmentation of the target group

Market segments must be measurable, accessible, substantial and actionable in order to deserve the attention. To meet these requirements, there is a need to select relevant market segmentation criteria.

The first target group is going to be separated according to psychographic segmentation. Psychographic segmentation takes into account the psychological aspects of consumer behaviour by dividing markets according to lifestyle, opinions, and interests of consumers:

- a) **Beekeepers** - in the Czech Republic, beekeepers are from the large part doing beekeeping as their hobby. Beekeeping can be a professional discipline implementing at bee's farms though. Nowadays, the Czech Beekeepers Association has over 46,000 members, representing 98% of all beekeepers in the country. The Czech Republic is among the countries with the highest organizational capacity of bee breeders in the world. This field of human activity is one of the oldest on Earth. (Český svaz včelařů 2019)
- b) **Farmers**
- c) **Wide public**

The second group of market segmentation criteria is based on geographic units. The target group is going to be divided geographically according to the country region as followed:

- d) **Olomouc Region**
- e) **Czech Republic**

13.2 Objectives and purposes of the promotion

Desired achievements of the promotion are to introduce the public of what current science in the field of biochemistry (especially concerning bees) can address and what impact it

may have. Further, to make some reflection on what is currently happening, though we do not hear about it daily from the media.

The desired achievements are to have 1 000 followers on Instagram account, 5 000 views of videos on YouTube channel, and to have at least 50 participants at each particular event.

13.3 Marketing communication tools

First of all, it is important to decide what type of media channels will be used. The suggestions are:

- a) Digital marketing/Internet presence: website, YouTube, social media (Facebook, Instagram), online articles
- b) Advertising in public places
- c) PR activities
- d) Print: newspaper, magazines, flyers, info graphic material and posters, local newspaper
- e) Event marketing and influencers

14 MEDIA PLAN

All the media activities are provided and proposed in this part of the thesis. The whole project is expected to introduce the public with the scientific project of Mgr. Martina Janků.

14.1 Logo and visual identity

The logo representing the project is supposed to connect all three main elements of the project – bee, flower and nitric oxide. The idea was to blend all three elements in together.



Figure 16: Logo of the project

Source: Own design created on Canva.com

Visual identity connecting the project is seen on Figure 17. The picture is supposed to connect three main subjects of the project: bee, nitric oxide and flower. Even though my personal ideas for the visual identity were more colourful, emotions touching and simple, Mrs Janků has chosen this particular design to represent her project (Figure 17). The picture is designed on Canva.com.



Figure 17: Visual identity of the project

Source: Own design created on Canva.com

14.2 Internet presence/Digital marketing

Internet presence is planned to be created with as little expenses as possible, because the budget for this project was said to be very low. Following suggested media are meeting those requirements.

Website

To support the promotion of the scientific project a blog about the issue of the bee's immune responses is going to be created on blog.cz. The name of the blog is going to be – *Don't stress the bee*. Mrs Janků is going to write blog posts there about her steps in her research, about new findings and about her future steps in her research. Each article is going to be supported with pictures.

Social Media

- **Instagram**

The Instagram account is going to be named *VědkyněMar*. It is going to be based on capturing the work of the young scientist. Martina is going to share her stories from the laboratory. Daily, she is going to share videos and pictures in Instagram stories. Each Insta-

gram's post is going to be supported by hashtags as *#biochemistry*, *#bee*, *#immunesystem*, *#nature*, *#science*, *#scientist*, *#womanscientist*.

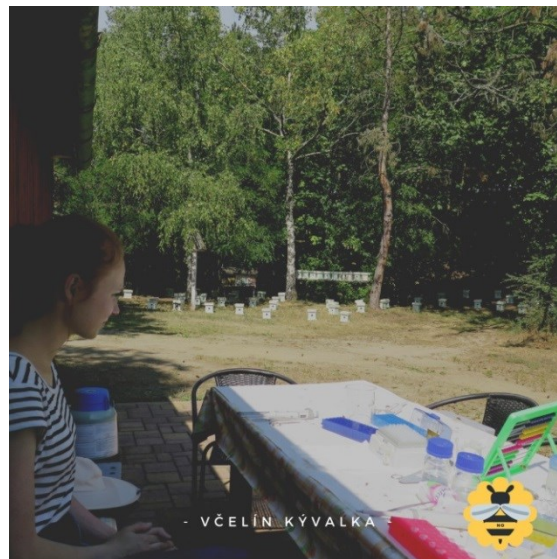


Figure 18: Instagram post 1

Source: Mrs Janků's own gallery

She is also going to share her life as the PhD student of biochemistry. She will share her research stay in Verona, her presentation on different conferences in Europe, which she is visiting as a part of her study. The main goal is to show that to be a scientist is not boring and inferior profession. Furthermore to show that science is nothing repulsive, but that it has its own magic. More Instagram post can be seen in appendix I.



Figure 19: Instagram post 2

Source: Mrs Janků's own gallery

- **Facebook**

Facebook profile is going to be established. The profile is going to be named *Don't Stress the Bee* and Mrs Janků is going to share details about her work on this Facebook profile. This profile is going to connect all of her other activities – planned exhibitions, her presentations, new podcasts or new contributions on her other social media networks. She is going to share these events in Beekeeping groups as *Včelařství* with more than six thousand users or *Coloss: Monitoring úspěšnosti zimování včelstev v ČR*. She is going to discuss, comment and share her ideas among the other users. When her English language is at sufficient level, and when she can communicate without any problem, also share her ideas in foreign Facebook groups as *Beekeeping for Beginners* (with 24 000 members), *Beekeeping Basic* (46 000 members) or *Beekeeping international* (74 000 members) can be an amazing way how to promote her project worldwide.

- **YouTube**

YouTube channel could be a nice place where to share Mrs Janků presentations. If there is a possibility to record her performance at events mentioned below, the videos are going to be uploaded here.

- **Other online activities**

The analytical part came up with the idea of promotion of science through podcasting. Mrs Janků can record her research on her own mobile phone and then upload it through Lybsin, which is “solution for everything”, if you want to start podcasting. You can share the podcast in Apple Podcasts, iTunes, or Spotify and even turn your show into an App. The price begins on 5 dollars per a month.

14.3 Advertising in public places

Exhibition of artistic photos of bees and flowers with short captions of scientific facts and short captions is going to be opened. This exposition is going to be named *Don't stress the bee*. It is going to be installed from the first day of spring and will last one month in the popular coffee shop in Šumperk called Pikola. Pikola is a small family café in the historical centre of Šumperk. They offer selective coffee, lemonade and desserts from honest and local ingredients. To highlight the cosy atmosphere in the space, each month they exhibit nature photographs. They like to do things in an unusual way and they love their customers. They love art, nature and support meaningful projects for free.



Figure 20: Picture for the exhibition

Source: own photo and design

The other slogans are:

- “I’m uncovering another view at the innate immunity of plants and bees.”
- “I say NO to pathogens.”
- “I reveal a new perspective on the immune system of plants and bees.”
- “I will show you the interdependence of plant and bee immunity.”
- “I will uncover the ranks of ropes in the immunity of plants and bees.”
- “Do we want to save them? Then we must understand them.”

The expenses for printing photos are expected to be for one picture, size 50x50cm, 120 CZK (in ADA Copysshop Šumperk). The space of the coffee shop is suitable

for eight pictures. Then the exhibition is supported by small A5 leaflets with interesting fact as followed:

“Did you know that nitric oxide (NO) plays an indispensable role in the physiological and pathological processes of many organisms? Until the mid-1980s, nitric oxide was referred to as a harmful molecule, but that changed in 1998. The American pharmacologists were those, who have also been awarded by the Nobel Prize for Medicine, and who clarified the role of nitric oxide in the immune system. Since then, nitric oxide research has moved on several levels, not only in our, human, immunity. Bees and flowers, even though they do not have the typical immune system producing the specific antibodies, they are able to use the rapid reactions of so-called innate immunity, which includes the production of this molecule, nitric oxide. The details are still hidden to us from the large part, but we know, that their discovery can help us to understand the interconnection of this complex system of defence reactions, which can then be used to protect bees and plants against attack microbial pathogens.”

14.4 Event marketing

During the opening of the exhibition, accompanying workshop with samples of Mrs Janků’s laboratory equipment is held. Colouring pictures and games will be prepared for children. The workshop will last two hours. Mrs Janků will be ready to have conversations with the participants about her research, science and anything else what will be attendees interested in.

14.5 Other PR activities

To support the public relations and to support providing the public with information, and to have a positive idea about Mrs Janků’s research work, attending following events and giving a presentation is organized. One event has already taken place (Coloss conference in Olomouc), that is why the feedback and evaluation is mentioned.

Coloss conference in Olomouc

As a part of the promotion of this science project the presentation for beekeepers at Coloss conference was held. Mrs Janků was presenting her research *Don't Stress the Bee* in front of almost one hundred people – mostly beekeepers, farmers and public, which was interested in this topic. The event was held in Olomouc. Her presentation lasted around 30 minutes and she tried to explain the core issues in the most understandable language. During the event, an anonymous questionnaire was sent in the audience and here are the comments and observations referring to Mrs Janků:

- *“Ladies have done it perfectly, however the topic has been difficult. I appreciate the idea, courage and performance.”*
- *“For the PhD student Janků, I'm giving the grade 2 and the reasons why is her really fast performance and speaking. But from a professional part, I am giving huge 1.”*
- *“All of you were wonderful and excellent, but if I want to highlight only one of the presenters, I would go for Miss Martina Janků and her lecture of Oxidative Stress of Bees. When I remember the lecture, it still gives me goose bumps (in good way). You are all amazing!”*
- *“What really excited me, were the contributions by your women colleagues. All of them were just amazing! Lecture on Oxidative Stress of Bees by Mgr. Janků was a pure science for me. I will never forget this presentation. It was awesome! It was nice to watch how the presenter tried her best to explain everything understandable to the lay public very complicated content of her research.”*

This event was Mrs Janků first experience with Public Relations event and she managed it fairly good. For the next time, she is going to work on her speed of talking and presenting for non-scientific public.

PechaKucha Night in Olomouc

Mrs Janků is going to present her research also at Pechakucha Night in Olomouc (The AFO edition) at the end of April 2019. She is going to have 20 minutes for her presentation. It is expected more than 50 participants.

Veletrh vědy 2019 (Science Fair)

Another suggested event is “Science Fair” which presents modern technology, innovative and successful products, production programs and development results at the PVA EXPO in Prague. The Science Fair presents the largest scientific workplaces of the Academy of Sciences of the Czech Republic, universities and innovative companies, so you can meet and establish contacts with representatives of the largest scientific societies, large and small companies presenting technologies of the future. The participants of the fair, profit the most from the exchange of ideas and they try to support this idea with an exclusive meeting of exhibitors, which is traditionally invited by the President of the Academy of Sciences of the Czech Republic and is open only to exhibitors.

14.6 Print

As the other marketing tools were proposed print media channels as newspaper, magazines, flyers, info graphic material and local newspaper. The concrete suggestions of those print media channels are as followed:

The magazine *Včelařství*

The journal brings professional materials from the field of beekeeping and news articles about the activities of the Czech Beekeepers Union. Its content contributes to the development of the field and communication between bee keepers. In the form of internal annexes, the reader is alerted to current changes in the legislative area concerning the activities of beekeepers. Taking into account the fact that *Včelařství* is the only beekeeping content-oriented periodical in the Czech Republic, it is irreplaceable in the dissemination of information in the direction of the professional and general public. *Včelařství* is published monthly at 50,000 copies. (Český svaz včelařů 2019)

This magazine is an ideal medium for publishing topic of nitrate oxide involvement in signalling and regulatory mechanisms of plant defence responses and in the honeybee's immune system.

The journal *Zemědělský týdeník*

Zemědělský týdeník is a journal that focuses on all branches of Czech, Slovak and world-wide agriculture. It is published every Thursday, the range is 24 pages and its readers are mainly active farmers, representatives of farms, scientists or traders.

The magazine *21. století*

21. století with its slogan “Science which you’ll enjoy!” is one of the most widely read Czech periodicals of science and technology. Its readership was around 266,000 in 2014. (21. století 2019)

14.7 Influencers

Czech influencers (micro – less than 10 000 followers and macro ones – thousands or millions of followers) are going to be approached. One of them is **Jan Lukačevič** (@lukacevicjan) mentioned earlier in this thesis. Even though Mr. Lukačevič (almost 5 000 followers on Instagram) is working in the field of astrology, he is also supporting on his social media channels different scientific disciplines. Lukačevič is going to cover the target group of wide public interested in science.

Anie Songe (@anie_songe), followed by 119 000 followers on Instagram is going to be addressed. Her content is created about her life in the Orlické Mountains. She supports ecological life and living in harmony with nature. It is possible that many young beekeepers, or people interested in topic of our project could be among her followers. Anie Songe is going to cover the target group of wide public interested in natural topics.

Then smaller accounts, like **Včely dědy Františka** (@vcely_dedy_frantiska) with 116 folowers, **Včelařství Horákovi** (@medarek) with 1 794 followers, **Včelařství Domovina** (@vcelarstvi.domovina) with 2 533 followers, **Šťastná včela** (@stastnavcela) with 589 and **Včely z Jestřebích hor** (@vcelyzjestrebichhor) with 418 followers, are approached. Those accounts are dedicated to the bee’s topics and are focused on the Czech Republic. **Neplejtvame.spk** (@neplejtvame.spk) with 196 followers and **Salatovník** (@salatovnik) with 677 followers, are Instagram accounts which are contributing with ecological topics in Olomouc region especially in Šumperk district. **Online farmářské trhy** @svetbedynek with 7 437 followers and also **Farma naděje** @farmanadeje with 6 005 followers are Instagram accounts focused on life on a farm.

14.8 Language of the promotion

Even though the language of science is English, the language of promotion is going to be Czech. In this stage is the promotion focused mainly on the Czech Republic. The language is simplified and tries to avoid special biochemistry terminology to make it accessible to wide public. From the already realized presentation we already know from the feedback, that the language is understandable. The only thing, which should be changed, is the speed of Mrs Janků talking during her presenting.

14.9 Financing and funding

Even though the promotion is planning to be low cost, some expenses (as printing pictures and other material, travelling expenses for the presentations and events) could be covered by a grant from the Olomouc Region. This grant can be obtained for the support for environmental and agricultural actions, or to support associations and organizations whose activities are environmental or agricultural. This grant supports the general public's awareness of the environmental, sustainable development of land use and agriculture. In addition, the grant title aims to develop leisure activities and leisure activities in these areas and thus contribute to the preservation or improvement of biodiversity and diversity of nature and landscape of the Olomouc Region. (Olomoucký kraj 2019)

Expenses of seminars, trainings, competitions, exhibitions, educational events and programs focusing on environmental issues and non-business leisure activities, directly organized or implemented by the applicant, can be covered by financing from the Olomouc Region. (Olomoucký kraj 2019)

14.10 Labour force

Finding people who will work for the project is another part of this promotion. Big part of employees will be marketers, designers, or similar, which can be also interesting for students of science or multimedia. It is important to recruit volunteers who will help to organize the project. This will be arranged mostly by Mrs Janků herself, who will give the presentations and me who will spread information on social media and organize events. It could also be student organizations or individuals who would want to contribute to the organization of the workshops and events or other stuff. The recruitment process will be done thanks to the social media.

15 IMPLEMENTATION OF THE PROJECT

Implementation of the project is the important part of any promotion. Time frame of the project, budget, SWOT analysis risk analysis and details are suggested and proposed in this chapter.

15.1 Time frame of the project

It is necessary to keep up with the schedule and have everything prepared before the start of the promotion. It is estimated that the total promotion will last approximately one year, which can be changed depending on the overall performance. Here is the rough time frame of the promotion:

- Coloss Conference, October 2018, Olomouc
- Social Media (Instagram, Facebook, YouTube, Podcasts), since October 2018
- Application for funding, 2nd – 20th May 2019
- PechaKucha Night, end of April 2019, Olomouc
- Exhibition at Pikola, June 2019, Šumperk
- Workshop at Pikola, Sunday 1st June 2019, Šumperk
- Science Fair, 6th - 8th June, 2019, Praha
- Influencers – collaborations alongside the whole planned promotion
- Print – journal articles - collaborations alongside the whole planned promotion

15.2 Risk and limits

Every promotion brings potential risk, but if it is enough effort put into research, it can be avoided. The probability of risk differentiates and the effect that would be caused can be low, medium or high. The final result (potential level of the risk) is reached based on the multiplication of numbers assigned to the degree and probability of the risk. Lack of finance and lack of popularity brings the highest risk in the campaign. On the contrary, it is estimated that there will be enough volunteers and influencers.

Risk	Probability of the risk			Degree of the risk			Result
	low	medium	high	low	medium	high	
	0,3	0,5	0,7	0,1	0,4	0,7	

Lack of finance		X				X	0,35
Lack of popularity		X				X	0,35
Higher cost than it is expected	X				X		0,12
Lack of volunteers and influencers		X		X			0,05
Lack of resources and information	X				X		0,12
Wrong media channels chosen	X				X		0,12
Low risk (0,00 - 0,14), Medium risk (0,15- 0,20), High risk (0,21 - 0,56)							

Figure 21: Risk Analysis

Source: own research

15.3 SWOT analysis

It is necessary to compare factors that could internally or externally influence the whole promotion of scientific project. In order to do so, the SWOT analysis reveals what strengths, weaknesses, opportunities and threats the promotion brings.

Strengths	Weaknesses
variety of media channels used	comprehensibility of the project
clearly defined target group	language of science
uniqueness of the topic	Bc. Janků missing expertise in science
Mgr. Janků's expertise in science	
Opportunities	Threats
possibility to stand out in Europe	no interest about this topic
new social media channels	lack of funding
possibility to include to the project topic of a woman in science	no interest from influencers or print media

Figure 22: SWOT analysis

Source: own research

The variety of media channels used, clearly defined target group, uniqueness of the project or Mgr. Janků's experience in science are ranked among the strengths of the project. On the other hand, comprehensibility of the project, language of the science or Bc. Janků's experience in science are considered as the weaknesses. The SWOT analysis farther away shows that the lack of funding, no interest about this topic or also no interest from influencers or print media, are the threats for this promotion. To stand out in Europe, including to the project the topic of woman in science or new channels are the opportunities suggested by the SWOT analysis in figure 22.

15.4 Measurements and evaluation of project results

The measurements will be done regularly. Earlier mentioned events are going to be measured by number of attendees of each particular event. At the events, questionnaires evaluating the presentation will be distributed or the access to the online questionnaire will be given in the last slide of each presentation. The promotion on Instagram and Facebook will be measure by reach and number of interactions – likes, comments and shares. The podcasts will be measured by number of listeners. YouTube channel will be measured by total number of views and blog by number of visits.

15.5 Future suggestions

The future suggestions for the project are to take the opportunity of every new social network for the promotion of specific scientific project. NASA's experts say that using different social media accounts and building the communities interesting in different scientific topics and using the right tone of communication is the key. Mrs Janků project has also a potential to engage attention abroad. Her English language after her 3 months stay in Italy is at satisfying level to give a presentation or write an article in English. The promotion can be then expanded to other countries. The community interested in this topic can become stronger then. Another topic, which could be interesting to widen the promotion by, is woman in science. Martina can present about her position as a woman in science at different events and conferences.

CONCLUSION

This thesis was focused on promotion of specific scientific discipline and its aim was to propose an original concept for biochemistry project. The idea was to create a promotion with low expenses (a budget depending on grant funding) for the target group containing of beekeepers, farmers and public interested in science.

In the theoretical part, marketing terms and necessary theoretical knowledge was explained. The promotion of science in the Czech Republic and abroad was described. The second part of this thesis was elaborated as qualitative research. This part was divided into primary data and secondary data research. The narrative research of mainly online available sources was elaborated. This research explored the barriers in science communications, an analysis of marketing communications by NASA, science on social media and internet presence, PR or advertising in science. The primary data research was based on information already gathered and was made as an interview with Mgr. Martina Janků, PhD student of Biochemistry at the Faculty of Science at Palacký University in Olomouc, the scientist who is in charge of the biochemistry project. Thanks to those data, promotion of biochemistry project could have been proposed in the last part. The media plan, SWOT and risk analyses were described as well.

To conclude, this thesis found out how to promote science in an interesting way. Furthermore, it tried to give an answer to the question if the science is at the moment promoted at sufficient level. It was found out, concerning the Czech Republic, that the finances in science and its promotion are not distributed rightly. Czech scientists say that even though there is nowadays more options how to promote science, the situation can be always better. The research questions, stated in the methodological part, were answered and the goal of the thesis was met.

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LIST OF ABBREVIATIONS

NASA National Aeronautics and Space Administration

NO Nitric oxide

TED Technology, Entertainment, Design

AFO Academia Film Olomouc

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APPENDIX P I: SOCIAL MEDIA POSTS



APPENDIX P II: INTERVIEW

What brought you to science? Especially what brought you to biochemistry?

What brought me to science and biochemistry? It was not a straightforward journey, when you set a target as a small one and follow it. So, I certainly didn't say to myself as a little girl that I would be a scientist and went for the fulfilment of this dream. My dream was to become a vet surgeon, helping to save lives, though "just" the animal ones. Considering this, I became closer to chemistry and biology, although I was enjoying those two subjects during my primary school too. I think, more or less, the circumstances brought me to science, and I've been enjoying its diversity, inscrutability and, above all, meaningfulness which holds me on it from now on. Especially biochemistry, because it is a branch of science connected with living organism.

What you want to promote? You want to promote the result of some particular scientific project? The institution? Or yourself? Something else?

I would like to support some meaningful project, which can help something, or someone. Often these are small pieces of a large jigsaw puzzle, which more people with many obstacles are working on together, but the more joy it brings when even the little step forward is made.

Why you want to communicate it to the public?

What are the reasons to familiarize public with the research? As far as science is concerned, it is a relatively "closed" discipline. This is mainly due to its complexity, and let's say "unattractiveness" to the general public. And it is a pity. Science is beautiful and it would be great if more of it was talked about. Science is here for us, for people, to help us, make our lives easier and better.

Does it change something? Does it help to something?

I think that it is primarily the task of us, young scientists, to show the children, to the future prospective students that science is not a boring and inferior profession, but to inspire them. Inspire those who have been attracted to science by greats like Einstein and others. The purpose of science popularization is, therefore, to show that science is nothing repulsive, but that it has its own magic. Show that we just need science, and also to familiarize

ourselves with the issues that affect our lives in some way, to pass on full-value information. It would be also awesome, if I could get feedback from people working in this area. For example, for my research on a honeybee immune system, any comment from a beekeeper who has a totally different perspective than I do, can be very beneficial.

To whom exactly is the information intended? Public is a board term. What target audience we are focusing on?

The results of the project are primarily intended for the scientific community, to the part that deals with this issue, which is like many other global issues. On the other hand, I would be happy, if this current issue was conveyed in a suitable form to the practitioners, for instance beekeepers, farmers and anyone interested, whether in our region or in our country in general.

What, in what extent, where and how, from the same or similar field of science, it has been published? Which media suit best to answers the previous questions?

I personally deal with reactive forms of oxygen and nitrogen in involvement in defence responses and immune responses in plants and honey bees. There are plenty of studies on this topic in plants. But it is a very complex and extensive system of events and much remains hidden. In addition, various scientific groups are focusing on a certain part of this wide-ranging issue, and there are still a lot of things that aren't completely clarified or come up with new approaches that bring new insights on the subject. This is the case, for example, in the part of the project aimed at involving these reactive forms of oxygen and nitrogen in the honeybee's immune system. We know a lot about insect immunity, but there has been one study showing the possible involvement of nitric oxide in activating the honey bee immune system, and there are so many questions as to why it is, what it helps, we can use it to make bees could they help to strengthen their defence against diseases and adverse environmental conditions?

What you want to achieve?

To introduce the public with an example of what current science can currently address and what impact it may have (also for a public) and even some reflection on what is happening, though we do not hear about it daily from the media.

What is your budget?

The expenses for the promotion should be as little as possible.

Are there some other limitations?

I would not want to harm it's nature. To take it down to its value, in order to just accomplish something.

What is your English language proficiency? Would you be able to for instance give a presentation in English?

My knowledge of English is not top-notch, but it is such, that I am able to communicate and work in a laboratory abroad. In addition, the language of science is currently English, so you write and read most of the studies in English. Something like a presentation in English becomes a common part of a scientific career over time.

Have you some feelings that gender is important in science? Do you have or have you ever had some disadvantages just because you are a woman?

The balance of men and women in science is still a little trouble. Women in science are not currently significantly oppressed, but I think they are still challenging, and have to face the prejudice that women do not belong to science. I also think they have a harder time in terms of starting a family. If you get out of the science for a while in can be after a year or so at a completely different level.

Do you think that science is nowadays promoted at sufficient level?

I think that rather yes. We have a lot of options that haven't been here before, but I'm not saying the situation couldn't be better. That can be always...

Thank you very much for your time. 😊