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Article

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Converting planetary boundaries into action, a new approach to meeting global greenhouse gas targets: A pitch

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Abstract: This pitch letter describes personal reflections on a pitch that was developed at the early stages of the pitching idea developed by Faff (2015a, b). This letter describes the processes and insights after having used the template several times. Overall, the author has positive experiences of the pitching template, and finds that the template aids the thinking and rigor of research ideas.

Keywords: Pitching research; Sustainable systems; Consumer behaviour; Micro-economics

JEL codes: Q30, Q54, Q56

1. Introduction

This letter reviews my experience of writing up the pitch template developed by Faff (2015a, b). I am currently undertaking a full-time PhD in Environmental Finance. My first pitch was completed in August 2014 and is based on a previous interdisciplinary PhD research topic developed at the end of 2012. After an undergraduate degree in International Business and a master degree in Finance, I undertook a graduate diploma in Sustainable Systems. Towards the end of the graduate diploma, a PhD project (described in my pitch) was originated and developed in collaboration with Dr Kate O'Brien (my current associate advisor) and was accepted as a PhD project in January 2013 in the School of Chemical Engineering at the University of Queensland. Unfortunately, I was not granted an

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International Post-Graduate Research Scholarship and was unable to undertake this project for financial reasons. I am still passionate about the topic, and similar to Beaumont (2015), mine is a ‘real’ pitch, i.e. an area of research I would like to undertake in the future. I believe the pitch template has assisted me both in refining and organising my research ideas, and in communicating and promoting research ideas. The remainder of this letter is structured as follows; section 2 provides a short background on the project to gain an understanding of the development of a research idea, section 3 discusses the reflections on how I filled out the pitch template and why this was useful, and section 4 concludes. The completed pitch template is illustrated in table 1.

2. Background on the topic

The topic of the pitch is climate change and individual action. During my studies in sustainable systems I learned about how human activities have become a significant influence on Earth Systems on which human life depends. The limits to these essential Earth Systems are described in a framework “the planetary boundaries”, which was published in *Nature* in 2009 (Rockstrom, 2009), and followed by many citations (>2800) had an updated version published in *Science* in 2015 (Steffen, 2015)¹. One of the planetary boundaries is climate change, where the international scientific community and policy makers have generally agreed humans should not exceed 350ppm of CO₂ in the atmosphere, and an increase in top-of-atmosphere radiative forcing of +1.0W m⁻², in order to prevent irreversible climate conditions that are less accommodating to human life. Most recent estimates indicate that meeting this limit implies that cumulative carbon emissions between 2011 and 2050 need to be limited to around 1,100 Gt CO₂ (McGlade, 2015). Humans have little understanding of what this number means, which constrains the effectiveness of this scientific research that aims to safeguard humanity. As a researcher aiming to be a responsible citizen, the fundamental research question I try to answer comes from an internal curiosity to solve a problem using scientific enquiry; what is my lifestyle currently contributing to climate change? e.g. how often can I ride my motorbike to university, how many kilometres can I fly in an aeroplane each year? What are the trade-offs? Finally, to create a significant change in human behaviour, the climate change research has to be translated into targets that individuals can understand, give them the freedom to meet their target, make it competitive and fun, and that can use market-mechanisms that allows people to trade with those who want to consume less than their “fair share”. The idea of this project is to develop a model that can be translated into an app that people can use. In this sense it has a commercialization component in it, yet note this is a coincidence and not a requirement for a research project.

3. Filling out the template – process and insights

Similar to Beaumont (2015), Ratiu (2015) and Unda (2015) my pitch was completed in a ‘non-linear’ way. Before filling out the template, my research idea had been included in short form into a formal PhD application that had required careful thought of the research project itself. I filled out the ‘low-hanging fruit’ first and for example, already had a working title for my project.

Pitch Parts (A) Working Title
 (B) Basic research question
 (C) key paper and
 (D) Motivation/Puzzle

The basic research question I think is usually very much related to the working title and asks which question you fundamentally try to answer, often ending up with a long sentence in order to be specific and descriptive. The key papers are usually obvious after you have done dedicated reading in the topic. Faff (2015a,b) describes the “cocktail glass” approach where you start off with a broad topic and narrow it down to the most “important and critical foundations” (p. 8, Faff (2015b)) for your research. For me, the chosen key paper was a consequence of my studies. It was a paper that was a timely and influential piece in the field of sustainability, and the paper collated the scientific literature to date. The key paper could therefore also be one or two papers that have motivated you in the first place or are likely to guide you most, which was the planetary boundaries framework for my pitch. Note that the key paper in my pitch template (table 1) is a paper dated in 2009, as my pitch was based on a PhD project proposed in 2012. The pitch template in this paper was left in its original state, though an updated pitch would include the latest planetary boundary paper by Steffen et al. (2015) in accordance with the latest scientific enquiry in the field. The motivation/puzzle gets you to think about why it is important what you want to research and what the opportunities are for filling the gap in the literature. Questions that helped me structure this section were; what are the facts? Why is it important? What is the link that is missing/the puzzle? What needs to be done to address the puzzle?

Pitch Parts (E) Idea?
 (F) Data?
 (G) Tools?

This section makes you think considerably on how you will go about the project and in more detail what needs to be done to solve the problem, what data you require and what tools you need. As I went through these sections, I found that I gained a deeper understanding of what I was going to do, as I usually find myself

with a great idea and a ‘feeling’ it is all possible, but when you write it down, you realise there is often a lot more to it.

The *Idea* section I find to follow up nicely from the motivation & puzzle section, as it described the idea and aim of the project, based on the puzzle. Questions I asked myself were: What will I do? How will I do it? Is it feasible? What is my aim? What will it ultimately create? The most difficult part for me was to be concise and clear on what the idea is, and to effectively and accurately communicate why this is a great idea.

The *Data* section I found to be a section that is relatively easy once you have done your background readings and have carefully thought through your idea. Nevertheless, I found it be a useful section that summarizes the data you need, how it can be accessed, what the costs are (and thus if it can be feasible), and any limitations you are facing.

Regarding the *Tools* section, I basically had a vision of what I wanted to do, but for some projects you can only guess how you are going to do it at an early stage. Questions I asked were; What am I going to do with my data and what knowledge do I need? The research idea discussed in my pitch requires input from various disciplines, which is highly revealed in this section. The *Other considerations* section later in the pitch template gives the opportunity to further comment on the challenges of this project.

Pitch Parts (H) What’s New?
 (I) So What?

The *What’s New* section and the *So what* are getting closer to the development of real importance of the research. First, the *What’s New* question is crucial for understanding the contribution of your project. If you do not know what is new, it probably is not new. In this section you want to highlight the specifics of what has not been done before. Generally, it is the combination of a few research areas or ideas that defines the novelty, and can be effectively communicated by the proposed “Mickey Mouse” diagram by Faff (2015a, b). This diagram is depicted in figure 1, where I propose that the novelty of the research proposal lies in the intersection of planetary boundaries, consumer behaviour and individual quotas/action. The *So What* question then asks why one should care about this research in the first place. For my project this was relatively easy as it aims to “avoid the most severe consequences of climate change”, but this question might be more difficult for other project.

Pitch parts (I) Contribution?
 (K) Other considerations?

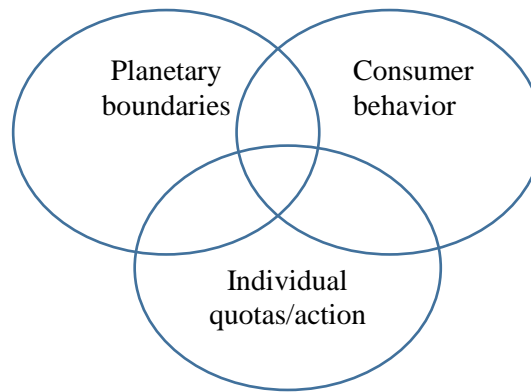


Figure 1. Mickey Mouse diagram characterizing novelty of research idea

Finally, the contribution, the one bottom line, or the “holy grail” as suggested by Faff (2015a, b). Filling out the previous parts of the pitch template helped me develop and clarify the contribution of my project. For the contribution, I basically summarized the information of all the previous sections, and focussed on what is different (“using an interdisciplinary approach to calculate individuals’ GHG emission quotas”), how will I do it (“use economic theory and consumer behaviour to translate this”) and what will it result in (“practical and effective action by individuals”). *Other considerations* is a section that was extended in more recent versions of Faff’s pitch template. At the time, I saw it as a section where I could outline the difficulties I might encounter or anything else worthy of mentioning. Even though I believe the interdisciplinary aspect of the project is a strength that adds to the project’s contribution, it also implies that collaboration with other fields is necessary.

4. Concluding remarks

In my opinion, the pitching using Faff’s template is a very useful exercise to make you think about your project thoroughly. It raises questions that you might not have thought of before or enough. Filling out the template also helps you formulate your research idea in a concise and functional way, and adds more rigor to your research idea. These benefits increase the quality of your research, which makes it more likely you will be able to ‘sell’ your research idea.

Since my first pitch I have tested the pitch by re-engineering a paper by Graham and Harvey (2001) (see supplementary materials Faff (2015b)), which was an interesting exercise that illustrated to me that most of the information in your pitch template actually is the backbone of the research paper. Further, I have used the template for my current PhD in two ways. First, I used the pitch template for the

PhD project as a whole, i.e. without a breakdown into three essays. Second, I used the pitch template for the first essay of my PhD, which was part of the assessment of RBUS6914 “The Research Process” at the University of Queensland. I found this a great opportunity because it allowed me to set aside time to structure my thoughts on my first essay, and communicate this with my supervisors accordingly. Overall, I think the pitching template is a very useful tool that I foresee using for my future research endeavours.

Acknowledgments

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¹ Note that at the time of writing up the research project, or the pitch idea, this updated version of the planetary boundaries was not yet published.

Table 1: Completed 2-page template on Sustainable Systems

Pitcher's Name	Saphira Rekker	FoR category	Sustainable Systems	Date Completed	30-October-2014
(A) Working Title	Converting planetary boundaries into action: a new approach to meeting global greenhouse gas targets				
(B) Basic Research Question	How can we use scientific planetary boundaries on greenhouse gas emissions as a tool to create guidelines for individuals to take action?				
(C) Key paper(s)	Rockström, J., Steffen, W., Noone, K., Persson, Å., Chapin, F. S., Lambin, E. F., ... & Nykvist, B. (2009). A safe operating space for humanity. <i>Nature</i> , 461(7263), 472-475.				
(D) Motivation/ Puzzle	Targets for global greenhouse gas emissions have been set by scientists, engineers and economists, to avoid the most severe consequences of climate change . However, achieving these targets is a “wicked problem”, i.e. a unique and complex problem, constantly changing, involving multiple stakeholders with conflicting interests and certitudes. Currently there is an essential link missing in the literature that translates theory into practice . While multiple schemes exist to engage industry and government, little recognition has been given to the role of individuals in reducing greenhouse gas emissions. Hence there is a need for practical tools that help individuals to reduce emissions to a ‘fair-share’ level . Herewith, this project addresses the global challenge of greenhouse gas (GHG) emissions reduction from a completely new angle. It uses a bottom up approach, using economic theory and scientific data.				
THREE	Three core aspects of any empirical research project i.e. the “IDioTs” guide				
(E) Idea?	This project addresses the global challenge of greenhouse gas (GHG) emissions reduction from a completely new angle . It uses a bottom up approach, using economic theory and scientific data . Ultimately the project develops a new tool to drive individuals to reduce GHG emissions associated with their consumption. Existing scientific knowledge is used to calculate individual quotas and lays the foundation of this research, currently missing in the literature. When this information is translated for individuals to use, it develops a practical solution to a complex problem , and thus filling a missing but essential piece to address this intractable global problem. By creating awareness about a range of actions that an individual could take-up, presenting the decision about what action to take as a game or app and linked to social networks/media, this research will develop an effective decision-support tool that could be commercialised. Also, the underlying model can be used to develop range of tools to fit different age groups and lifestyles.				
(F) Data?	<ul style="list-style-type: none"> - Use available data on GHG emissions of production and consumption, and calculate individual GHG emission quotas (based on global emission targets) using GHG emission accounting techniques. The global Trade Analysts Project Database provides per capita CO₂ emissions of 8 different consumption categories for all countries. Prices of this database are \$1080, should be able to get funding. Research by Rockstrom et al. (2009) provide calculations of global emission boundaries for our planet. - Ultimately the emissions per consumption category per capita would be calculated in a universal way, though as of yet this data varies per country, so as a starting point we would use Australian CO₂ emissions per consumption category. 				

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Pitcher's Name	Saphira Rekker	FoR category	Sustainable Systems	Date Completed	30-October-2014
(G) Tools?	An optimization model will be developed and applied to determine how the constraint of this individual quota can be met to reduce GHG emissions globally, given constraints and meaningful options for individuals. Economic modelling (including input--output techniques) and systems dynamics will be used to identify an (most) optimal solution based on emission constraints. Development of software that utilizes the optimization model that can be 'played' by the individual according to his/her preferences, motivated by incentives and meeting the emission constraints. This final stage is constructed using economic theory (e.g. game theory) and psychology on consumer behaviour . The underlying model of the software, can be used to develop several applications to create a change in consumptive behaviour.				
TWO	Two key questions				
(H) What's New?	The research will be distinctive in that carbon footprints of individuals are compared to scientifically determined limits to CO₂ emissions . These limits outline how much we can emit if we want to keep living in a 'safe human operating space' – and live life as we know it. These scientific limits are only known recently and there is no research as of yet that translates these planetary limits into individual's consumption patterns and thus into how to take practical and effective action into meeting these targets (individuals being one of the multiple parties playing a role in meeting these targets). Economic theory and psychology on consumer behaviour provide insight on how to best design a practical tool to assist individual consumer's decision--making. This will be a software game or an 'app', possibly linked to social networks/media, that takes into account the individuals' planetary GHG constraints but honours the individuals' freedom of choice to meet this constraint. The tool will aid people to monitor and reduce their emissions, motivated by meeting constraints. It ultimately draws upon natural human behaviour, such as competitive or financial incentives, to make it attractive to a wide range of individuals including those unaware or sceptical of climate change.				
(I) So What?	Urgent action should be taken if humans want to avoid the most severe consequences of climate change and individual's play a key role in meeting the CO ₂ limits set by scientists.				
ONE	One bottom line				
(J) Contribution?	Using an interdisciplinary approach to calculate individuals' GHG emission quotas and use economic theory and psychology on consumer behaviour to translate this into practical and effective action by individuals.				
(K) Other Considerations	As it is very interdisciplinary, collaboration with experts in different fields is necessary. Knowledge needed of ecological processes (natural scientists), software development, programming, economic theory, and psychology. I have little knowledge of relevant journals. As it is interdisciplinary a wider range of journals might be interested. Probably journals in the natural sciences would be most interested.				