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Crowdfunding for climate change: Exploring the use of climate frames by environmental entrepreneurs

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ABSTRACT

This study investigates which climate change frames environmental entrepreneurs can employ in their project descriptions while seeking crowdfunding on online platforms. An explorative analysis of 58 climate change mitigation projects was conducted in four countries with different degrees of maturity of crowdfunding market. The following climate change frames prevail, and appear particularly in the descriptions of the projects with successful campaigns: promotion goal frame, humans-related impact frame, positive valence frame, and near future and now time frame. Many projects with successful crowdfunding campaigns also mention their location. This study contributes to the sustainable crowdfunding literature by addressing an underexplored topic of framing and following a qualitative in-depth approach. Moreover, it can help environmental entrepreneurs understand the landscape of framing opportunities and therefore make a more informed choice of what kind of frames to employ in their project descriptions.

1. Introduction

Anthropogenic climate change presents a global threat to human societies and the planet, with potentially devastating consequences (UNEP, 2020; IPCC, 2018), making climate actions more urgent than ever. Researchers argue that environmental entrepreneurship – a subset of the broader concept of sustainable entrepreneurship – could help to resolve some of these problems by alleviating "environmentally relevant market failures through the exploitation of potentially profitable opportunities" (Dean and McMullen, 2007, p. 51) and thus contribute to achieving environmental sustainability (York and Venkataraman, 2010). Nevertheless, sustainable entrepreneurs often experience problems gaining finance for their ventures from traditional sources (Ortas et al., 2013). Climate change mitigation technologies might be risky and costly to develop; moreover, according to Messeni Petruzzelli et al. (2019), the need to balance economic and environmental goals adds ambiguity that can make projects less attractive for traditional investors than pure for-profit projects, especially in the early funding phases. It is therefore crucial to explore alternative financing schemes for sustainable entrepreneurs (Testa et al., 2019), including the environmental ones.

Crowdfunding – obtaining funding from a potentially large pool of interested backers, where each backer provides a relatively small amount of money, often without standard financial intermediaries (Shneor and Maehle, 2020) – represents an interesting opportunity here, with several major benefits. The recent interest in sustainable crowdfunding (Maehle, 2020; Messeni Petruzzelli et al., 2019; Motylska-Kuzma, 2018; Testa et al., 2019; Vasileiadou et al., 2015; Wehnert et al., 2019) reflects its relevance for sustainable ventures. In addition to securing funding, crowdfunding provides increased exposure for a product and company (Belleflamme et al., 2014), "word of mouth" buzz (Lehner, 2013), and increased public support and legitimacy (Lam and Law, 2016). By bringing like-minded individuals, firms and investors together, crowdfunding can help to scale up sustainable innovations developed by environmental entrepreneurs (Brabham, 2008; Bocken et al., 2014), and in this way contribute to achieving the scale at which climate change mitigation technologies might make a significant difference on a global level.

It is important to acknowledge that dynamics of sustainable crowdfunding are much more complex than in conventional crowdfunding (Messeni Petruzzelli et al., 2019). In addition to traditional crowdfunding appeals, environmental entrepreneurs focusing on climate

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change mitigation projects (i.e. projects aiming to reduce or prevent emission of greenhouse gases; UNEP, 2020) can build on a wide range of climate change related frames. Framing means highlighting certain aspects over others by selecting the ones that appear as more relevant to a particular target group to encourage behaviour change (Nisbet, 2009). In the case of crowdfunding, framing refers to how to describe a project so persuasively that it attracts potential investors. For example, environmental entrepreneurs can emphasize either climate-related threats and problems, or hopes and opportunities. The manner in which climate change is framed triggers societal perceptions and behaviour (Corner et al., 2011; Dewulf, 2013; Stevenson et al., 2018; Weingart et al., 2000), and the relevance of different frames – i.e. the way how the message is framed – depends on what matters to individuals (Nisbet and Mooney, 2007).

Climate change is a complex phenomenon that is difficult to communicate due to its spatial and temporal distance (Lorenzoni et al., 2007). Current generations already experience climate change consequences (Viglione, 2020); however, the most severe of them will be mainly encountered by future generations (causing temporal distance). Moreover, the places first affected by climate change are the ones least responsible and most vulnerable to extreme weather patterns (spatial distance) (O'Neill and Nicholson-Cole, 2009; Stoknes, 2014). In the past, climate change scientists assumed that the scientific facts would speak for themselves (Nisbet, 2009). They adopted a rational and quantitative form of communication, focusing less on the qualitative, culturally adapted approaches needed to bring about behavioural change in the general public (Stoknes, 2014). However, information is never objective and has to be reframed, so that it becomes relevant for people (Nisbet, 2009). Frames can trigger people's emotional response to climate change, bringing hopes or concerns that are crucial for behaviour change (Stevenson et al., 2018).

While literature on crowdfunding has explored the effects of linguistic styles (Chen et al., 2016; Majumdar and Bose, 2018), it remains unclear how environmental entrepreneurs use framing related to climate change to promote their crowdfunding ventures. To address this gap, an explorative study is conducted to investigate which climate change frames environmental entrepreneurs use in their project descriptions on online crowdfunding platforms. In particular, the study focuses on entrepreneurs launching climate change mitigation projects. Please note that the current study does not consider the actual impact of the crowdfunded climate initiatives on the emission reduction; it rather focuses on the crowdfunding process itself. However, it is expected that crowdfunding can help increasing the number of climate change mitigation projects and this in turn will contribute to emission reduction.

This study contributes to the emerging stream of literature on sustainable crowdfunding (Maehle, 2020; Messeni Petruzzelli et al., 2019; Motylska-Kuzma, 2018; Testa et al., 2019; Wehnert et al., 2019) in several ways. First, it addresses a need for more in-depth qualitative studies exploring how sustainable entrepreneurs use crowdfunding. The majority of the research in this field builds upon a quantitative analysis of large datasets; however, to add to our understanding of the crowdfunding dynamics it is highly important to supplement this approach with in-depth qualitative studies (Testa et al., 2019). Second, it discusses the importance of framing a project description in sustainable crowdfunding. Despite many studies across several social science disciplines using framing theory (Whitmarsh et al., 2019), it remains an under-explored topic in the sustainable crowdfunding research. Using a framing perspective is especially relevant in sustainable crowdfunding, as in this case social and psychological motivations may be equally or more important than economic ones. Therefore, highlighting certain aspects of the project through framing may play a significant role in building a convincing investment story and achieving crowdfunding success (Manning and Bejarano, 2017; Testa et al., 2019). Third, this study conducts an explorative review of climate frames used by environmental entrepreneurs in their crowdfunding campaigns and in this way brings together the fields of climate psychology and crowdfunding. It also indicates the impact of various climate frames on campaign success.[1]

2. Framing in crowdfunding of climate change mitigation projects

Framing is "the way the story is written" (Cappella and Jamieson, 1997, p. 39), the choice of specific words, rhetorical devices, narrative form, and so on. Framing sets an issue within "an appropriate context to achieve a desired interpretation" (Shome et al., 2009, p. 6). Frames act as "interpretive storylines that set a specific train of thought in motion, communicating why an issue might be a problem, who or what might be responsible for it, and what should be done about it" (Nisbet, 2009, p. 15). By selecting, packaging and organizing the information, the author can highlight particular aspects of the story that may motivate individuals to behave in a certain way (Entman, 1993; Defazio et al., 2020; Nisbet, 2009).

Linguistic strategies, such as storytelling, play an important role for entrepreneurial ventures to acquire resources from investors (Moss et al., 2018; Pan et al., 2020). This is especially true in the case of crowdfunding because engagement with potential investors relies on Internet-based, computer-mediated and a-synchronous communication, through a crowdfunding platform. The written project descriptions published on the platform account for a large part of the interaction and information absorbed by potential investors, who make decisions without face-to-face contact (Gorbotai and Nelson, 2015). As funding decisions are based on a very limited amount of digitally conveyed information, effective communication is key to successful crowdfunding (Parhankangas and Renko, 2017). Several studies (Gao et al., 2018; Kedves, 2016; Mitra and Gilbert, 2014) have demonstrated that project description is an important factor in determining crowdfunding success. Communication style is particularly important for crowdfunding success of social entrepreneurs, as they are an emergent category that is more difficult to predict than commercial entrepreneurs in a more traditional domain (Parhankangas and Renko, 2017). Similarly, sustainable projects – such as the ones launched by environmental entrepreneurs – are often more ambiguous due to the intangibility of sustainable claims and outputs; to compensate, communication with potential backers has to be extremely effective and persuasive (Hörisch, 2015; Maehle, 2020; Messeni Petruzzelli et al., 2019).

Section 3 presents an overview of climate change frames from the climate psychology literature that environmental entrepreneurs can use in their project description while seeking crowdfunding.

3. Climate change frames

3.1. Goal frames: Promotion and prevention

A goal frame assumes that people approach goals with either a promotion or a prevention focus. According to regulatory focus theory (Higgins, 1997), individuals with a promotion focus pursue their goals in terms of hopes and aspirations; they are oriented towards accomplishment and sensitive to the presence and absence of gain/non-gain outcomes. Individuals with a prevention focus pursue their goals in terms of duties and obligations; they are oriented towards security and sensitive to the presence and absence of non-loss/loss outcomes. Thus, people with a promotion focus act to maximise their gains, while people with a prevention focus aim to maintain the status quo and reduce their risks (Spence and Pidgeon, 2010). For a message to be persuasive, there should be a fit between the framing of the message and a recipient's regulatory state, i.e. their promotion or prevention focus (Cesario et al., 2004). The goal frame is widely used in social marketing, but also in

[1] Successful campaigns are those that have reached their targeted amount in their given time period.

climate change communication; the promotion goal frame features words like "ideal," "maximise gains" or "hope", while the prevention frame uses words such as "ought," "prevent," "protect (ion)" or "minimise losses" (Shome et al., 2009).

3.2. Impact frames

Impact frames focus on who or what will be affected by climate change. There are narratives focusing on humans as victims of climate change and narratives addressing wildlife and the environment (Busch, 2016). How people respond to different frames depends on their personal concerns, e.g. some people worry about the nature, while others concern about wellbeing of humans. Depending on what is important to an individual, the chosen object in an impact frame will trigger different reactions. For example, Dickinson et al. (2013) showed that bird watchers react strongly to the impacts of climate change on bird species, thus making a wildlife frame more effective than a human impact frame. Since individuals follow different interests, research suggests the application of a wide range of impact frames or interconnected frames (including the consequences of climate change for both wildlife and humans) to capture a wide audience in climate communication (Busch, 2016).

3.3. Attribution frames

The attribution frame is about who is responsible or to blame for climate change. It addresses the question of whether climate change is considered a natural phenomenon or caused by humans. The actions people take to reduce greenhouse gas (GHG) emissions certainly depend on who they view as responsible. Previous research has shown that belief in anthropogenic climate change is positively related to climate change engagement (Stevenson et al., 2018). If climate change is viewed as naturally occurring, people's actions to reduce GHG emissions are seen as less important because people feel this is beyond their influence (Busch, 2016). Furthermore, people experience more collective guilt if they consider humans are responsible for climate change (Ferguson and Branscombe, 2010). Other studies show that ascribing responsibility for climate change to certain groups can also activate their defence mechanism, leading to a lower likelihood of believing that humans cause climate change (Jang, 2013).

3.4. Valence frames

Valence frames focus on either positive or negative framing of climate change by playing on people's emotions (Busch, 2016). Positive framing emphasises the environmental and climate benefits of particular behaviour, for instance choosing green products (Amatulli et al., 2019). Negative frames focus on the harmful consequences for the climate and environment if people do not engage in a particular action (Amatulli et al., 2019; White et al., 2011). For example, negative frames can focus on apocalypse, uncertainty, and high costs or losses (Stoknes, 2014). Previous research on how message framing influences behavioural change is mixed. Several studies argue that positive frames are more effective in terms of gains through climate change mitigation (Spence and Pidgeon, 2010; Gifford and Comeau, 2011). Too much negative framing can desensitise people to fear appeals, reduce trust in organisations communicating climate change and lead to undesirable counteractive reactions (O'Neill and Nicholson-Cole, 2009; Manzo, 2010).

3.5. Spatial frames

Using spatial frames addresses the spatial distance of climate change impact. Climate change literature usually distinguishes between a local and a global frame (Buch, 2016). Previous research emphasises the importance of making climate change personally relevant by focusing on proximate places, impacts on local communities and culturally important places (Nisbet, 2009; Stoknes, 2014). According to Scannell and Gifford (2013), there can also be local opportunities for reducing GHG emissions as place attachment has a positive influence on climate change engagement. Furthermore, Lujala et al. (2015) argue that people who have experienced personal damage in their own area due to climate change show increased concern about it.

3.6. Temporal frames

Temporal frames focus on the effects of climate change over time, and relate to the temporal distance between the causes and effects of climate change (Kyongseok and Ahn, 2019). The current research results are mixed. Some authors (Shome et al., 2009) argue that people generally react more strongly to immediate threats that can limit action if climate scientists communicate the negative consequences of climate change as a future risk. Others (Rabinovich et al., 2010) state that a focus on the distant future can get people to act more consistently. Kyongseok and Ahn (2019) argue that perceptions of temporal distance are culturally embedded. In Western societies, people often regard climate change as a distant threat that will affect future generations. To communicate climate change successfully, campaigns therefore should align with societies' temporal perception of climate change and its impacts (Kyongseok and Ahn, 2019).

Section 4 discusses how the data sample was composed and how the frames discussed above were applied in the data analysis.

4. Methodological approach

4.1. Data collection

The data was collected between August and December 2018. Since this research is exploratory and aims to provide some of the first insights into the underexplored topic, a diverse sampling method was applied (Seawright and Gerring, 2008). The data included the descriptions of 58 climate change mitigation projects from online crowdfunding platforms, where entrepreneurs usually publish their campaigns in form of project descriptions to invite backers to invest (Maehle, 2020). The project descriptions analysed in this study included all the text about the projects and related images provided on the platform website. External links or videos were not considered to secure consistency, as not all projects included these elements.

Crowdfunding platforms and projects were selected based on a range of criteria. One of the selection criteria for platforms was the availability of projects aiming to mitigate climate change, which is defined as:

> *"… efforts to reduce or prevent emission of greenhouse gases. Mitigation can mean using new technologies and renewable energies, making older equipment more energy efficient, or changing management practices or consumer behaviour. It can be as complex as a plan for a new city, or as a simple as improvements to a cook stove design."* (UNEP, 2020).

Additionally, the aim was to include platforms operating different crowdfunding models. There are four main crowdfunding models: donation-based, reward-based, equity-based and lending-based (Mollick, 2014). Donation-based crowdfunding allows backers to support a certain cause philanthropically, with no expectation of monetary or material return. Reward-based means backers receive various non-monetary rewards or products in exchange for their investment. Lending-based crowdfunding is, as the name suggests, when backers provide loans to an entrepreneur and receive fixed periodic income as well as repayment of their investment (Bruton et al., 2015). In equity-based crowdfunding, backers receive an ownership stake in the venture they invest in (Ahlers et al., 2015). We included two lending-based platforms, three donation-based platforms, three equity-based platforms and four reward-based platforms (see Appendix A for an overview of the selected platforms). Additionally, one platform

combined lending- and reward-based models and one combined equity- and lending-based models. To address crowdfunding markets with different degrees of maturity (e.g. in terms of policies and regulations for crowdfunding, and size of crowdfunding market), the data sample included platforms and projects from four countries: the Netherlands, Norway, the USA and the UK. The USA is one of the leading countries in terms of crowdfunding, ranking second worldwide with a total annual transaction value of USD 718 million in November 2019 (Statista.com, 2019a). Although China ranks first globally, Chinese platforms were not included in the sample due to the language barrier. The UK was included as it has the largest European market for crowdfunding, with a total annual transaction value of USD 88 million in November 2019. The Netherlands is one of the frontrunners in Europe regarding crowdfunding for renewable energy projects and was therefore included in the sample (Oneplanetcrowd, 2019). Additionally, two of the authors are native Dutch speakers, which facilitated selection and analysis of the project descriptions. Finally, Norway was included as its crowdfunding market is still in its infancy, with USD 5 million crowdfunded by February 2019, but has recently demonstrated significant growth potential (Statista.com, 2019b; Shneor, 2020). Moreover, two of the authors are fluent in the Norwegian language, which facilitated selection and analysis of the project descriptions.

After selecting the platforms, the authors browsed them to identify the potential climate change mitigation projects following the definition of climate change mitigation (UNEP, 2020) presented in the beginning of this section. As a result, 58 projects were identified. The selected projects represented various measures for mitigating climate change. Most of them directly prevented CO_2 emissions and thus climate change, e.g. by focusing on sustainable energy, sustainable transport, saving materials and energy. Projects that reduced CO_2 emissions indirectly were also included, e.g. a community building project demonstrating how various actors – individuals, municipalities, neighbourhoods and businesses – mitigated climate change. Lastly, projects on carbon capture were selected as they prevent the uptake of CO_2 in the atmosphere. Table 1 shows the aggregated number of projects per country and crowdfunding model. In this way, a highly diverse dataset was created with different contextual conditions for crowdfunding platforms and entrepreneurs, in line with the exploratory nature of the research goal (Seawright and Gerring, 2008). Note that it was not possible to find climate change mitigation projects for all types of crowdfunding models in each country. For example, in Norway there was no climate change mitigation projects using donation and lending-based crowdfunding due to the less developed crowdfunding market.

4.2. Data analysis

The descriptions of the 58 selected projects were stored in a database and uploaded to NVivo, a software program for qualitative and quantitative analysis of data (NViVo, 2019). Building on the literature review of climate change frames (Section 3), a set of codes for analysing the climate change frames was created. Then a provisional coding procedure was followed, so that codes were adapted, removed or added to the list during the data analysis (Saldaña, 2015). Framing codes were removed from the list if they did not discriminate between different project descriptions or proved to be irrelevant for the data set. For example, as all the projects in the sample attributed climate change only to humans, the attribution frame was removed from the further analysis. See Table 2 for final codes for analysing the climate change frames in project descriptions.

Using these codes, two researchers independently coded the data in the project descriptions, and discussed the codes until full consensus was reached (Harry et al., 2005; Saldaña, 2015). Appendix B presents examples of how the codes were used by showing pieces of text selected from the project descriptions and highlighting the parts providing evidence for a presence of a particular frame. If a frame was found in the project description, it was coded as a "1", if a frame was not found in the project description it was coded as a "0". If there was no consensus, the researchers either discussed the particular project description and coded until they agreed on the assigned code (building on the existing definition of the frame), or adapted the frame definition. As full consensus still had to be reached for some project descriptions, a second group of three researchers iteratively and extensively checked the first group's data analysis. Frame definitions were revised and the assigned scores cross-checked. This is an appropriate method, given the intermediate sample size (n = 58). See Supplementary material for an overview of the frames present in each project description.

Table 1
Number of selected climate change mitigation projects per country and crowdfunding model.

	Donation	Equity	Lending	Reward	Total
Netherlands	1	1	10	5	17
Norway	N.A.[a]	3	N.A.	5	8
UK	3	3	7	5	18
USA	5	1	1	8	15
Total	9	8	18	23	58

[a] N.A. – Not available.

5. Findings

After coding the data, the researchers counted the number of frames observed in the project descriptions. Tables 3 and 4 present the number of different frames found in the project descriptions per crowdfunding model and country. Please note that each project description can contain several options of the same frame. For example, a project description can combine both negative and positive framing of climate change mitigation, or can focus on both "far future" and "near future".

The following trends are observed in how environmental entrepreneurs write their project descriptions based on climate change frames. Most descriptions involve the promotion frame (49 out of 58) and positive framing (53 out of 58). Only 18 descriptions contain negative framing. While describing the impact of their projects, entrepreneurs tend to use the human impact frame (42 out of 58) in their descriptions, while only 27 project descriptions include the nature impact frame and 11 include both. To highlight their local connection, 32 descriptions provide a specific location of their projects. The temporal framing in most project descriptions addresses either now (39 projects) or near future (28 projects).

Unfortunately, overrepresentation of reward and lending-based crowdfunding in the sample limits the ability to analyse the differences across crowdfunding models. Variations across countries are very small, which can partly be explained by a limited sample size.

To indicate how the use of various climate frames in the project descriptions influences the projects' crowdfunding success (i.e. reaching the target amount in the given time period), the frequencies of using various frames in the project descriptions were calculated for the projects with successful and unsuccessful crowdfunding campaigns (see Table 5). To allow for easier comparisons, Table 5 also shows the percentages of how often the project descriptions contain each frame among the other projects with either successful or unsuccessful campaigns. For example, one project with a successful campaign has the prevention frame in its description and this one project represents four per cent of the total number of the projects with a successful campaign. In the sample, there are 25 projects with successful crowdfunding campaigns, 31 projects with unsuccessful campaigns and two projects that cancelled their campaigns. The following patterns are identified. The descriptions of the projects with successful crowdfunding campaigns have stronger focus on promotion goal than the ones with unsuccessful campaigns (96% of the ones with a successful campaign versus 77% of the ones with an unsuccessful campaign). They also to a larger degree mention humans as a victim of problems the project is attempting to tackle (84% of the ones with a successful campaign versus

Table 2
Final codes for analysing the climate change frames in project descriptions.

Frame	Options	Definition	Literature sources
Goal	Prevention	The project description emphasises a specific climate change issue and convinces potential backers that, when realised, the project can prevent the issue fromescalating or continuing.	Cesario et al. (2004); Higgins (1997); Shome et al. (2009); Spence and Pidgeon (2010)
	Promotion	The project description focuses on a solution to a climate change-related issue and promotes an alternative to the status quo.	
	Combined	Both prevention and promotion elements found in the project description	
Impact	Humans	The project description names humanity as a victim of problems the project is attempting to tackle.	Busch (2016); Dickinson et al. (2013)
	Nature	The project description names nature or environment (animals, forests or oceans) as a victim of problems the project is attempting to tackle.	
	None	The project description does not name a main victim of problems the project is attempting to tackle.	
	Combined	The project description names both humans and nature as victims of problems the project is attempting to tackle.	
Valence	Negative	Inclusion of negative emotions and fear-inducing language emphasising consequences instead of opportunities; communication of threats and problems.	Amatulli et al. (2019); Busch (2016); Manzo (2010); O'Neill and Nicholson-Cole (2009)
	Positive	Inclusion of positive emotions and gain-inducing language emphasising opportunities instead of consequences; communication of hope and feasibility.	
	Neutral	No explicit positive or negative elements found in the project description.	
	Combined	Both positive and negative elements found in the project description.	
Specific location	Project location	Location of the project is mentioned in the description.	Nisbet (2009); Scannell and Gifford (2013); Stoknes (2014)
Temporal	Far future	The project description addresses climate change as issue for the far future or/and addresses far-future problems (future generations) as the main consequence of climate change.	Shome et al. (2009); Rabinovich et al. (2010)
	Near future	The project description addresses near-future problems (coming months or years) as the main consequence of climate change.	
	Now	Climate change related events are happening as we speak (e.g. extreme weather conditions; extinct animal species; forced migrations).	
	Combined	The project description combines several temporal frames.	

61% of the ones with an unsuccessful campaign), while having less attention on the impact on nature (24% of the ones with a successful campaign versus 65% of the ones with an unsuccessful campaign).

In addition, the descriptions of the projects with successful campaigns use fewer negative messages highlighting threats and problems (8% of the ones with a successful campaign versus 48% of the ones with an unsuccessful campaign), and avoid combining negative and positive messages (4% of the ones with a successful campaign versus 42% of the ones with an unsuccessful campaign). Moreover, they more often mention a specific location (68% of the ones with a successful campaign versus 45% of the ones with an unsuccessful campaign) and have stronger emphasis on "near future" (56% of the ones with a successful campaign versus 42% of the ones with an unsuccessful campaign).

6. Discussion

6.1. Overview of climate frames

The findings show that most of the projects launched by environmental entrepreneurs use reward and lending-based models for their crowdfunding campaigns (see Table 1). This is consistent with the general development of the crowdfunding market, demonstrating the clear dominance of a lending-based model, and the strength of equity-based and reward-based models (Ziegler et al., 2019). The reason for the slight overrepresentation of reward-based crowdfunding and underrepresentation of equity-based crowdfunding in the sample is the higher intangibility of sustainable claims and therefore higher risk associated with environmental projects (Maehle, 2020; Messeni Petruzzelli et al., 2019). High-risk associations increase the preference for

Table 3
Number of climate change frames per crowdfunding model.

Climate change frames		Donation	Reward	Lending	Equity	Total
Goal	Prevention	3	5	1	0	9
	Promotion	5	18	17	9	49
	Combined	0	0	0	0	0
Impact	Humans	7	12	15	8	42
	Nature	5	18	3	1	27
	None	0	0	1	0	1
	Combined	3	6	1	1	11
Valence	Negative	5	11	1	1	18
	Positive	8	22	15	8	53
	Neutral	0	0	2	0	2
	Combined negative and positive	4	10	0	1	15
Specific location	Project specific location	7	7	15	3	32
Temporal	Far future	2	1	0	1	4
	Near future	3	10	8	7	28
	Now	7	14	15	3	39
	Combined	2	2	5	2	11

Table 4
Number of climate change frames per country.

Climate change frames		N'lands[a]	Norway	UK	USA	Total
Goal	Prevention	1	2	4	2	9
	Promotion	16	6	14	13	49
	Combined	0	0	0	0	0
Impact	Humans	14	7	13	8	42
	Nature	6	4	7	10	27
	None	0	0	0	1	1
	Combined humans/nature	3	3	1	4	11
Valence	Negative	1	4	9	4	18
	Positive	16	7	15	15	53
	Neutral	1	0	1	0	2
	Combined negative/positive	1	3	7	4	15
Specific location	Project specific location	11	5	10	6	32
Temporal	Far future	1	1	1	1	4
	Near future	5	4	11	8	28
	Now	13	3	15	8	39
	Combined	2	0	7	2	11

[a] N'lands: The Netherlands.

Table 5
Overview of climate change frames in the descriptions of the projects with successful and unsuccessful crowdfunding campaigns (in number and % of projects).

Climate change frames		Successful, no. of projects	Successful, % of projects	Unsuccessful, no. of projects	Unsuccessful, % of projects
Goal	Prevention	1	4	7	23
	Promotion	24	96	24	77
	Combined	0	0	0	0
Impact	Humans	21	84	19	61
	Nature	6	24	20	65
	None	1	4	0	0
	Combined humans/nature	3	12	8	26
Valence	Negative	2	8	15	48
	Positive	22	88	29	94
	Neutral	2	8	0	0
	Combined negative/positive	1	4	13	42
Specific location	Project specific location	17	68	14	45
Temporal	Far future	1	4	3	10
	Near future	14	56	13	42
	Now	17	68	21	68
	Combined	6	24	5	16

non-investment models such as reward-based crowdfunding.

When addressing the climate change frames used in the project descriptions, the following patterns are identified. Most project descriptions use the promotion frame and emphasize the advantages of climate change mitigation technologies (Spence and Pidgeon, 2010); this focus is especially strong in the projects with successful crowdfunding campaigns. For instance, the project converting a coal-fired power station to run on sustainable energy pellets made from industrial and commercial waste describes its solution to a climate change-related issue in the following way:

> *"The money raised in this offer will help fund the conversion of the Uskmouth power plant. […] In common with MeyGen, the Wyre estuary power project is expected to be a trailblazer, unlocking more of the opportunity for large-scale, long term renewable power from our seas."* (AB_LBC_UK_2)[2]

Another project focusing on marine renewable energy highlights that climate change is solvable and describes an alternative to the status quo:

> *"We are here to raise awareness and funds to support the emergence of totally new, clean and renewable forms of energy from ocean wind, wave, and tidal energy …"* (CH_DBS_USA_2).

To achieve persuasion there should be a fit between the framing of the message and a recipient's regulatory state (Cesario et al., 2004). Some sources (e.g. Shome et al., 2009) therefore recommend combining promotion and prevention frames in climate change communication to address recipients with both kinds of regulatory state. However, in the current sample none of the projects use this combination in their descriptions. Moreover, as mentioned above, the descriptions of the projects with successful campaigns mostly use the promotion frame.

The overrepresentation of the promotion frame in the descriptions of climate change mitigation projects may be explained by the tendency towards positive framing (Spence and Pidgeon, 2010; Gifford and Comeau, 2011). Most of the project descriptions in the sample use positive framing and emphasize the environmental and climate benefits. For example, the project on clean tech systems for the aquaculture industry discusses how it contributes to the positive aquaculture:

> "This clean technology is used to locally produce antibiotic free, environmentally sustainable shrimp. The energy needed on the farm is provided by clean solar roofing. NOVATON calls this "Positive Aquaculture"!" (CRC_EBC_UK_2)

The project introducing a new type of a garbage bin without using plastic bags describes its environmental benefits:

> "This means finding a way to limit needless garbage, and limiting the amount of plastic trash bags that transport this garbage to the landfill is a small but effective step in helping the environment." (KS_RBC_USA_6).

It is also observed that the descriptions of the projects with successful campaigns use fewer negative messages and avoid combining negative and positive messages. This finding is consistent with the literature on climate change communication (Gifford and Comeau, 2011; Spence and Pidgeon, 2010). Several studies (Manzo, 2010; O'Neill and Nicholson-Cole, 2009) argue that negative framing can desensitise people to fear appeals and therefore cause counteractive reactions. People tend to avoid climate change communication framed as doom and sacrifice (Stoknes, 2014). In addition, using language indicative of positive psychological capital (hope, optimism, resilience, and confidence) improves general crowdfunding performance (Anglin et al., 2018).

The majority of the descriptions – especially the ones of the projects with successful crowdfunding campaigns – address humans, not nature or the environment, as the victim of the problems they are tackling, in other words they use the human impact frame. For example, one of the projects on plastic waste recycling argues that "*the future of humanity depends on us*" (CRC_EBC_UK_4). People's reactions to the impact frame depend on their greatest concerns (Dickinson et al., 2013). Entrepreneurs seem to believe that addressing humans helps them to appeal to a larger audience than just the environmentally engaged public. Using the human impact frame may also increase the relevance of the climate change technologies and reduce the distancing problem identified in the climate literature (Stoknes, 2014; Ryghaug et al., 2011). Rose et al. (2020) argue that psychological distance reduces individual campaign contributions and crowdfunding performance.

Another way to make climate change mitigation measures more relevant and less distant, is to use spatial and temporal frames. Previous climate research (Nisbet, 2009; Stoknes, 2014) emphasises focusing on proximate places and local communities to make climate change personally relevant. However, most of the project descriptions in the sample do not specify project location. There are several explanations for this finding. First, the projects published on global crowdfunding platforms like Kickstarter want to appeal to a global audience. Second, many of the issues addressed by climate change mitigation projects have a global rather than local impact, e.g. new solar energy technology or nanotechnology filters can be used anywhere in the world. At the same

[2] The projects are marked by four indicators: platform (please see Appendix A), crowdfunding model, country, and project number. Crowdfunding models: DBC (donation-based), RBC (reward-based), LBC (loan-based), EBC (equity-based). Countries: UK (the United Kingdom), NO (Norway), US (the United States), NL (the Netherlands).

time, the descriptions of the projects with successful crowdfunding campaigns mention their location more often than the ones with unsuccessful campaigns, which indicates the importance of the location.

As for the temporal frame, the majority of the project descriptions focus on the near future and now – particularly in the case of successful campaigns –, which may increase their relevance. For example, the project building a wave power plant uses 5–10 years perspective:

> "Our first potential test scientist – in the Canary Islands – has indicated a wish to deploy up to 200 MW for the next 5–10 years after our functional test." (FI_EBC_NO_4).

> Another project on magnet engines promises the results already in 2020: *"If everything goes as planned, results will show up in 2020."* (KS_RBC_NL_3).

According to Shome et al. (2009), as people react more strongly to immediate threats, focusing on the near future and now can motivate them to act, and so invest in the project. However, to get people more engaged with climate change mitigation measures in a consistent and long-term perspective, projects may consider also focusing on the distant future (Rabinovich et al., 2010).

6.2. Limitations and future research directions

This study has a number of limitations that future research can address. To begin with, to the best of the authors' knowledge, it is one of the first attempts to connect two bodies of literature (climate change frames and crowdfunding) and therefore a qualitative explorative rather than a quantitative comparative approach was followed. Being of an explorative type, the current study identifies the patterns of using climate change frames in successful and unsuccessful crowdfunding campaigns and in this way represents an important background for further investigation. The next step should be a more systematic quantitative approach comparing the effects of different climate change frames on campaign's success. Second, further comparison of using various frames across countries and models are invited. For instance, one of the research directions could be to see how framing of climate change mitigation projects relates to cultural dimensions (Hofstede, 2011), as there is a call for more crowdfunding research in different cultural settings (Shneor and Maehle, 2020). It is also possible to investigate the connection between a type of crowdfunding model and various frames since backers' motivations to invest vary across different types of models (Bretschneider and Leimeister, 2017). Third, researchers may explore non-climate related frames addressing the projects' co-benefits such as green jobs, saving money, improved air quality, quieter streets and better public health (Nisbet, 2009; Lorenzoni et al., 2007; Maibach et al., 2010; Graham et al., 2019) and how they influence the success of crowdfunding campaigns. Previous research in agriculture has shown that emphasising the co-benefits (increased yields, soil improvement) of climate measures can encourage people to adopt climate mitigation practices (Dumbrell et al., 2016; Otte and Vik, 2017). Moreover, other types of climate-related frames can be considered, e.g. frames based on Sustainable Development Goals (Maehle et al., 2020) and frames based on sustainability gains from the emerging practice of sustainability assessment (Konys, 2018). Fourth, the future studies may address the combined effect of different frames. For example, Chang et al. (2015) show people react more strongly to "green" advertising with a negative loss frame in the present (temporal frame) and a positive gain frame in the long-term future. Other research has demonstrated that fear loaded representations of climate change can enhance people's feelings that climate change is a distant concern (spatial and temporal frame) (O'Neill and Nicholson-Cole, 2009). Finally, this study does not address the actual climate impact of the crowdfunded climate change mitigation projects. Future studies can take a longitudinal approach following the crowdfunded projects over time and measuring their actual impact on the emission reduction.

7. Conclusion

This study provides an explorative review of climate change frames used by environmental entrepreneurs in their project descriptions published on online crowdfunding platforms. To identify the frames, an explorative analysis of 58 climate change mitigation projects was conducted in four countries with different degrees of maturity of crowdfunding market. The findings indicate that the following climate change frames prevail in the project descriptions, and appear particularly in the projects with successful crowdfunding campaigns: promotion goal frame, humans-related impact frame, positive valence frame, and near future and now time frame. Many projects with successful crowdfunding campaigns also mention their location.

By exploring what kind of climate change frames environmental entrepreneurs use in their communication with potential backers, this study makes several significant contributions. First, it contributes to the crowdfunding literature by addressing an underexplored topic of framing. Written appeals such as project descriptions are highly important in crowdfunding, as it relies heavily on Internet-based and computer-mediated communication. This makes the framing of written messages a crucial part of the crowdfunding process. However, until recently, framing theory has received limited attention in the sustainable crowdfunding literature, and the current study fills this gap by providing an overview of various frames used in the project descriptions in climate change crowdfunding campaigns. Second, this study adds to the emerging research on sustainable crowdfunding, which still lacks qualitative in-depth studies. Third, one of the main contributions of the study is that it brings together the fields of climate psychology and crowdfunding by exploring how the climate change frames identified in the climate psychology literature can be applied in crowdfunding context. Finally, this study contributes to the literature on environmental entrepreneurship by highlighting that crowdfunding can represent an additional funding source for environmental ventures.

As for managerial implications, this study provides new knowledge for environmental entrepreneurs aiming to launch crowdfunding campaigns. Despite its explorative nature, the current study can help entrepreneurs understand the landscape of framing opportunities and therefore make a more informed choice of what kind of frames to employ in their project descriptions.

The current study has also several policy implications. Taken into account the opportunities provided by crowdfunding to the environmental entrepreneurs, the policymakers should acknowledge its importance for realizing sustainable projects and provide an enabling context for extended use of crowdfunding. Among other things, it is important to educate entrepreneurs about crowdfunding and how to use it for financing their initiatives, e.g. by providing an overview of possible climate frames they can use in their campaigns as identified in this study.

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CRediT authorship contribution statement

Natalia Maehle: Conceptualization, Methodology, Validation, Formal analysis, Investigation, Data curation, Writing – original draft, Writing – review & editing, Visualization, Supervision. **Pia Piroschka Otte:** Conceptualization, Methodology, Validation, Formal analysis, Investigation, Writing – original draft, Writing – review & editing, Supervision, Project administration, Funding acquisition. **Boukje Huijben:** Conceptualization, Methodology, Validation, Formal analysis, Investigation, Writing – original draft, Writing – review & editing. **Jorick de Vries:** Formal analysis, Investigation.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix C. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jclepro.2021.128040.

Appendix A. Overview of selected crowdfunding platforms

Platform	Country of the published projects	Crowdfunding model	URL
Abundance (AB)	UK	Lending	https://www.abundanceinvestment.com/
Bidra (BI)	Norway	Reward	https://bidra.no/
Chuffed (CH)	Netherlands, UK, USA	Donation	https://chuffed.org/us
CrowdCube (CRC)	UK	Equity	https://www.crowdcube.com/explore/about-us
Folkeinvest (FI)	Norway	Equity	https://www.folkeinvest.no/
GoFundMe (GFM)	USA	Donation	https://www.gofundme.com/
Greencrowd (GC)	Netherlands	Lending	https://greencrowd.nl/
IndieGoGo (IGG)	USA	Reward	https://www.indiegogo.com/
JustGiving (JG)	UK	Donation	https://www.justgiving.com/
Kickstarter (KS)	UK, USA, Norway, Netherlands	Reward	https://www.kickstarter.com/
OnePlanetCrowd (OPC)	Netherlands	Lending, Reward	https://www.oneplanetcrowd.com/nl
Symbid (SB)	Netherlands	Equity	https://www.symbid.nl/?locale=nl&controller=home&action=index
Spleis (SPL)	Norway	Reward	https://www.spleis.no/
WeFunder (WF)	USA	Equity, Lending	https://wefunder.com/

Appendix B. Examples of climate change frames in the project descriptions#

Goal	Prevention	"It is said that within 50 years, there will probably be more plastic than fish in the water - specifically microplastic. We must think in new ways and act fast." (BI_RBC_NO_1)
		"As many regions of the nation, particularly California and the American Southwest, face unprecedented water shortages." (GFM_DBC_USA_1)
		"… mitigating millions of tons of demolition waste that go to land fills each year." (KS_RBC_USA_1)
	Promotion	"Invest to build a new biochemical and biofuel production plant, which has the patents to turn low value residues of the whisky industry into higher value sustainable chemicals and biofuels." (AB_LBC_UK_5)
		"The new owners see the potential in the Green Deal to dramatically improve the poor energy efficiency of the UK's housing stock to build a successful business at the same time." (AB_LBC_UK_8).
		"Just as Tesla has interrupted the auto industry, we aim to lead the future of the high-performance and sustainable motorcycling" (WF_EBC_USA_1).
		"The SunSaluter boosts solar panel output by 30%. It is 30 times less expensive than conventional motorized solar trackers, consumes no electricity, and also produces clean drinking water" (CH_DBC_USA_4).
Impact	Humans	"We raise funded for the "Solar Energy Without Borders" organization that builds solar cells in poor village environments. **It helps reduce the poverty** in the world in a sustainable way … We will only win the fight against poverty if we also take care of the climate and the environment" (SPL_RBC_NO_1).
		"By supporting our Urban Wind Turbine you are supporting **a chance for a person to own the rights to their energy production and consumption**. For less than the price of most cars these days you can harvest the wind and can help create **cleaner energy for yourself and your community**" (KS_RBC_USA_4).
	Nature	"We want to emphasize, first how important it is to turn to the green shift. **The world is particularly vulnerable now that the atmosphere is on the verge**, and we must act, and not only speculate. (BI_RBC_NO_1).
		"It is a small but **effective step in helping the environment** … help us in our journey to make the world a better, **cleaner, greener world** …" (KS_RBC_USA_6)
Valence	Negative	"Climate Change needs two things to happen - reduce our production of greenhouse gases, and increase the amount of carbon removed from the atmosphere. **We fear that the actions in Sheffield are doing the exact opposite of both!** (CH_DBC_UK_1).
		"As plastic bags become more and more common and oil supplies become spare it is more important than ever to find a way to deal with trash in a more sustainable fashion … find a way **to limit needless garbage**" (KS_RBC_USA_6)
	Positive	" We are seeking funds now to educate, train and **inspire** young people to include ocean energy in their clean energy projects at school, in universities and at home" (CH_DBC_USA_2).
		"..was to design the coolest **high quality** e-bike we could for the Norwegian climate and terrain. A bike that is so tough that we have no second thoughts about delivering it with the **very best** warranty-terms …" (KS_RBC_NO_3).
Temporal	Far future	"**By 2050** there will be more plastics than fish in our oceans" (CH_RBC_UK_1).
		"our collective work to decrease carbon emissions to slow down climate change will positively impact **generations to come**" (CH_DBC_USA_2).
	Near future	"Our aim to save the planet from 25 million disposable plastic/styrofoam plates in the **next 3 years**" (CH_DBC_UK_2).
		"Over the course of **the 18 months** a production well and an injection well will be drilled and tested before the power plant is constructed above ground. (AB_LBC_UK_6).
	Now	"**To date** we have saved the planet from over 55,000 disposable plastic/styrofoam plates" (CH_DBC_UK_2).

Note: The projects are marked by four indicators: platform (see Appendix A), crowdfunding model, country, and project number. Crowdfunding models: DBC (donation-based), RBC (reward-based), LBC (loan-based), EBC (equity-based). Countries: UK (the United Kingdom), NO (Norway), US (the United States), NL (the Netherlands).

The most important parts of the text are highlighted in bold.

References

Ahlers, G.K., Cumming, D., Günther, C., et al., 2015. Signaling in equity crowdfunding. Enterpren. Theor. Pract. 39 (4), 955–980.

Amatulli, C., De Angelis, M., Peluso, A.M., et al., 2019. The effect of negative message framing on green consumption: an investigation of the role of shame. J. Bus. Ethics 157 (4), 1111–1132.

Anglin, A.H., Short, J.C., Drover, W., et al., 2018. The power of positivity? The influence of positive psychological capital language on crowdfunding performance. J. Bus. Ventur. 33 (4), 470–492.

Belleflamme, P., Lambert, T., Schwienbacher, A., 2014. Crowdfunding: tapping the right crowd. J. Bus. Ventur. 29 (5), 585–609.

Bocken, N.M.P., Short, S.W., Rana, P., et al., 2014. A literature and practice review to develop sustainable business model archetypes. J. Clean. Prod. 65, 42–56.

Brabham, D., 2008. Crowdsourcing as a model for problem solving: an introduction and cases. Convergence 14 (1), 75–90.

Bretschneider, U., Leimeister, J.M., 2017. Not just an ego-trip: exploring backers' motivation for funding in incentive-based crowdfunding. J. Strat. Inf. Syst. 26 (4), 246–260.

Bruton, G., Khavul, S., Siegel, D., et al., 2015. New financial alternatives in seeding entrepreneurship: microfinance, crowdfunding, and peer-to-peer innovations. Enterpren. Theor. Pract. 1 (39), 9–26.

Busch, K.C., 2016. Polar bears or people? Exploring ways in which teachers frame climate change in the classroom. Int. J. Sci. Educ., Part B 6 (2), 137–165.

Cappella, J.N., Jamieson, K.H., 1997. Spiral of Cynicism: the Press and the Public Good. Oxford University Press, New York.

Cesario, J., Grant, H., Higgins, E.T., 2004. Regulatory fit and persuasion: transfer from "feeling right". J. Pers. Soc. Psychol. 86 (3), 388–404.

Chang, H., Zhang, L., Xie, G.X., 2015. Message framing in green advertising: the effect of construal level and consumer environmental concern. Int. J. Advert. 34 (1), 158–176.

Chen, S., Thomas, S., Kohli, C., 2016. What really makes a promotional campaign succeed on a crowdfunding platform? Guilt, utilitarian products, emotional messaging, and fewer but meaningful rewards drive donations. J. Advert. Res. 56 (1), 81–94.

Corner, A., Parkhill, K.A., Pidgeon, N., 2011. Experiment Earth?: Reflections on a Public Dialogue on Geoengineering. Working Paper. School of Psychology, Cardiff University.

Dean, T.J., McMullen, J.S., 2007. Toward a theory of sustainablity entrepreneurship: reducing environmental degradation through entrepreneurial action. J. Bus. Ventur. 22 (1), 50–76.

Defazio, D., Franzoni, C., Rossi-Lamastra, C., 2020. How pro-social framing affects the success of crowdfunding projects: the role of emphasis and information crowdedness. J. Bus. Ethics. https://doi.org/10.1007/s10551-020-04428-1.

Dewulf, A., 2013. Contrasting frames in policy debates on climate change adaptation. Climate Change 4 (4), 321–330.

Dickinson, J.L., Crain, R., Yalowitz, S., et al., 2013. How framing climate change influences citizen scientists' intentions to do something about it. J. Environ. Educ. 44 (3), 145–158.

Dumbrell, N.P., Kragt, M.E., Gibson, F.L., 2016. What carbon farming activities are farmers likely to adopt? A best–worst scaling survey. Land Use Pol. 54, 29–37.

Entman, R.M., 1993. Framing: toward clarification of a fractured paradigm. J. Commun. 43 (4), 51–58.

Ferguson, M.A., Branscombe, N.R., 2010. Collective guilt mediates the effect of beliefs about global warming on willingness to engage in mitigation behaviour. J. Environ. Psychol. 30, 135–142.

Gao, Q., Lin, M., Sias, R., 2018. Words Matter: the Role of Texts in Online Credit Markets. Available at SSRN. https://ssrn.com/abstract=2446114. Accessed September 20, 2020.

Gifford, R., Comeau, L.A., 2011. Message framing influences perceived climate change competence, engagement, and behavioral intentions. Global Environ. Change 21, 1301–1307.

Gorbatai, A.D., Nelson, L., 2015. Gender and the Language of Crowdfunding. Academy of Management Proceedings. Available at. https://journals.aom.org/doi/abs/10.5465/ambpp.2015.15785abstract. Accessed September 30, 2020.

Graham, H., De Bell, S., Hanley, N., et al., 2019. Willingness to pay for policies to reduce future deaths from climate change: evidence from a British survey. Publ. Health 174, 110–117.

Harry, B., Sturges, K.M., Klingner, J.K., 2005. Mapping the process: an exemplar of process and challenge in grounded theory analysis. Educ. Res. 34 (1), 3–13.

Higgins, E.T., 1997. Beyond pleasure and pain. Am. Psychol. 52, 1280–1300.

Hofstede, G., 2011. Dimensionalizing cultures: the Hofstede model in context. Online Readings in Psychology and Culture 2 (1). https://doi.org/10.9707/2307-0919.1014.

Hörisch, J., 2015. Crowdfunding for environmental ventures: an empirical analysis of the influence of environmental orientation on the success of crowdfunding initiatives. J. Clean. Prod. 107, 636–645.

IPCC, 2018. Global Warming of 1.5°C. Available at. https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_Full_Report_High_Res.pdf. Accessed February 1, 2021.

Jang, S.M., 2013. Framing responsibility in climate change discourse: ethnocentric attribution bias, perceived causes, and policy attitudes. J. Environ. Psychol. 36, 27–36.

Kedves, A., 2016. Discursive legitimation in online crowdfunding: a study of Kickstarter projects promoting human rights. Globe: A Journal of Language, Culture and Communication 3, 46–63.

Konys, A., 2018. An ontology-based knowledge modelling for a sustainability assessment domain. Sustainability 10, 300. https://doi.org/10.3390/su10020300.

Kyongseok, K., Sunn Joo, A., 2019. The moderating role of cultural background in temporal framing: focusing on climate change awareness advertising. Asian J. Commun. 29 (4), 363–385. https://doi.org/10.1080/01292986.2019.1624793.

Lam, P.T., Law, A.O., 2016. Crowdfunding for renewable and sustainable energy projects: an exploratory case study approach. Renew. Sustain. Energy Rev. 60, 11–20.

Lehner, O.M., 2013. Crowdfunding social ventures: a model and research agenda. Ventur. Cap. 15 (4), 289–311.

Lorenzoni, I., Nicholson-Cole, S., Whitmarsh, L., 2007. Barriers perceived to engaging with climate change among the UK public and their policy implications. Global Environ. Change 17, 445–459.

Lujala, P., Lein, H., Rød, J.K., 2015. Climate change, natural hazards, and risk perception: the role of proximity and personal experience. Local Environ. 20 (4), 489–509.

Maehle, N., 2020. Sustainable crowdfunding: insights from the project perspective. Baltic J. Manag. 15 (2), 281–302.

Maehle, N., Otte, P.P., Drozdova, N., 2020. Crowdfunding sustainability. In: Shneor, R., Zhao, L., Flåten, B.-T. (Eds.), Advances in Crowdfunding: Research and Practice. Palgrave Macmillan, pp. 393–422.

Maibach, E.W., Nisbet, M., Baldwin, P., et al., 2010. Reframing climate change as a public health issue: an exploratory study of public reactions. BMC Publ. Health 10, 299.

Majumdar, A., Bose, I., 2018. My words for your pizza: an analysis of persuasive narratives in online crowdfunding. Inf. Manag. 55 (6), 781–794.

Manning, S., Bejarano, T.A., 2017. Convincing the crowd: entrepreneurial storytelling in crowdfunding campaigns. Strat. Organ. 15 (2), 194–219.

Manzo, K., 2010. Beyond polar bears? Re-envisioning climate change. Meteorol. Appl. 17, 196–208.

Messeni Petruzzelli, A., Natalicchio, A., Panniello, U., et al., 2019. Understanding the crowdfunding phenomenon and its implications for sustainability. Technol. Forecast. Soc. Change 141, 138–148.

Mitra, T., Gilbert, E., 2014. The language that gets people to give: phrases that predict success on Kickstarter. Proceedings of the 17th ACM Conference on Computer Supported Cooperative Work & Social Computing, pp. 49–61.

Mollick, E., 2014. The dynamics of crowdfunding: an exploratory study. J. Bus. Ventur. 29 (1), 1–16.

Moss, T.W., Renko, M., Block, E., et al., 2018. Funding the story of hybrid ventures: crowdfunder lending preferences and linguistic hybridity. J. Bus. Ventur. 33 (5), 643–659.

Motylska-Kuzma, A., 2018. Crowdfunding and sustainable development. Sustainability 10 (12), 4650.

Nisbet, M.C., 2009. Communicating climate change: why frames matter for public engagement. Environment 51 (2), 12–23.

Nisbet, M.C., Mooney, C., 2007. Framing science. Science 316 (5821), 56.

NViVo, 2019. What Is NVivo? Available at. https://www.qsrinternational.com/nvivo/what-is-nvivo. Accessed July 20, 2020.

O'Neill, S., Nicholson-Cole, S., 2009. "Fear won't do it": promoting positive engagement with climate change through visual and iconic representations. Sci. Commun. 30 (3), 355–379.

Oneplanetcrowd, 2019. Internationaal samenwerken voor het versnellen van de energietransitie in Europa. Available at. https://www.oneplanetcrowd.com/nl/blog/200346. Accessed December 1, 2019.

Ortas, E., Burritt, R.L., Moneva, J.M., 2013. Socially responsible investment and cleaner production in the Asia Pacific: does it pay to be good? J. Clean. Prod. 52, 272–280.

Otte, P.P., Vik, J., 2017. Biochar systems: developing a socio-technical system framework for biochar production in Norway. Technol. Soc. 51, 34–45.

Pan, L., Li, X., Chen, J., et al., 2020. Sounds novel or familiar? Entrepreneurs' framing strategy in the venture capital market. J. Bus. Ventur. 35 (2) https://doi.org/10.1016/j.jbusvent.2019.02.003.

Parhankangas, A., Renko, M., 2017. Linguistic style and crowdfunding success among commercial and social entrepreneurs. J. Bus. Ventur. 32 (2), 215–236.

Rabinovich, A., Morton, T., Postmes, T., 2010. Time perspective and attitude-behaviour consistency in future-oriented behaviours. Br. J. Soc. Psychol. 1 (49), 69–89.

Rose, S., Wentzel, D., Hopp, C., et al., 2020. Launching for success: the effects of psychological distance and mental simulation on funding decisions and crowdfunding performance. J. Bus. Ventur. https://doi.org/10.1016/j.jbusvent.2020.106021.

Ryghaug, M., Sørensen, K.H., Næss, R., 2011. Making sense of global warming: Norwegians appropriating knowledge of anthropogenic climate change. Publ. Understand. Sci. 20 (6), 778–795.

Saldaña, J., 2015. The Coding Manual for Qualitative Researchers. Sage publications, Thousand Oaks: CA.

Scannell, L., Gifford, R., 2013. Personally relevant climate change: the role of place attachment and local versus global message framing in engagement. Environ. Behav. 45 (1), 60–85.

Seawright, J., Gerring, W., 2008. Case selection techniques in case study research: a menu of qualitative and quantitative options. Polit. Res. Q. 61, 294–308.

Shneor, R., Maehle, N., 2020. Editorial – advancing crowdfunding research: new insights and future research agenda. Baltic J. Manag. 15 (2), 141–147.

Shneor, R., 2020. Crowdfunding in Norway: Status Report 2019 Q1-Q4. Oslo: Norwegian Crowdfunding Association. Available at. https://www.crowdfunding-research.org/norwegian-market-statistics. Accessed January 20, 2021.

Shome, D., Marx, S., Appelt, K., et al., 2009. The Psychology of Climate Change Communication: A Guide for Scientists, Journalists, Educators, Political Aides, and the Interested Public. Center for Research on Environmental Decisions, New York.
Spence, A., Pidgeon, N., 2010. Framing and communicating climate change: the effects of distance and outcome frame manipulations. Global Environ. Change 20, 656–667.
Statistacom, 2019. Crowdfunding United States. Available at. https://www.statista.com/outlook/335/109/crowdfunding/united-states#market-globalRevenue. Accessed December 20, 2019.
Statista.com, 2019. Crowdfunding Norway. Available at. https://www.statista.com/outlook/335/145/crowdfunding/norway. Accessed December 20, 2019.
Stevenson, K.T., King, T.L., Selm, K.R., et al., 2018. Framing climate change communication to prompt individual and collective action among adolescents from agricultural communities. Environ. Educ. Res. 24 (3), 365–377.
Stoknes, P.E., 2014. Rethinking climate communications and the 'psychological climate paradox. Energy Research and Social Science 1, 161–170.
Testa, S., Nielsen, K.R., Bogers, M., et al., 2019. The role of crowdfunding in moving towards a sustainable society. Technol. Forecast. Soc. Change 141, 66–73.
UNEP, 2020. United Nations Environment Program: Mitigation. Available at. https://www.unenvironment.org/explore-topics/climate-change/what-we-do/mitigation. Accessed September 25, 2020.
Vasileiadou, E., Huijben, J., Raven, R., 2015. Three is a crowd? Exploring the potential of crowdfunding for renewable energy in The Netherlands. J. Clean. Prod. 30, 1–14.
Viglione, G., 2020. Climate Lawsuits Are Breaking New Legal Ground to Protect the Planet. Available at. https://www.nature.com/articles/d41586-020-00175-5. Accessed March 1, 2021.
Wehnert, P., Baccarella, C.V., Beckmann, M., 2019. In crowdfunding we trust? Investigating crowdfunding success as a signal for enhancing trust in sustainable product features. Technol. Forecast. Soc. Change 141, 128–137.
Weingart, P., Engels, A., Pansegrau, P., 2000. Risks of communication: discourses on climate change in science, politics, and the mass media. Publ. Understand. Sci. 9 (3), 261–283.
White, K., MacDonnell, R., Dahl, D.W., 2011. It's the mind-set that matters: the role of construal level and message framing in influencing consumer efficacy and conservation behaviors. J. Market. Res. 48 (3), 472–485.
Whitmarsh, L., Xenias, D., Jones, C.R., 2019. Framing effects on public support for carbon capture and storage. Palgrave Communications 5, 17.
York, J.G., Venkataraman, S., 2010. The entrepreneur–environment nexus: uncertainty, innovation, and allocation. J. Bus. Ventur. 25 (5), 449–463.
Ziegler, T., Shneor, R., Wenzlaff, K., et al., 2019. The 4th European Alternative Finance Benchmarking Report. Cambridge University Centre for Alternative Finance, Cambridge, UK.