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Tools Proposedto Better Manage the CO_2 Emissions in Organizations: Learning & Insight

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This study addresses an important and relatively new topic by investigating the CO_2 constraints that businesses will face with the future worldwide CO_2 regulation and will focus on the barriers that prevent the employees within a company to better manage it. After a description of the current and possible future CO_2 emissions constraints and regulation, it will be deeply study the main barriers that prevent today the employee engagement in the CO_2 reduction policy. Then, a possible solution that engages individually all workers of a business in the reduction of their CO_2 emissions will be tested.

INTRODUCTION

Firms worldwide, responding to the threat of government legislation or to concerns raised by their own consumers or shareholders, are undertaking initiatives to reduce their carbon footprint. (Benjaafar, B. Yanzhi, L. Mark, D. (2010)). Carbon Footprint is now a buzzword widely used across the media (Wiedmann, T. and Minx, J. (2008)) and companies started to create tool to manage it properly.

We can find in the scientific literature various description of tools that enable supply chain manager to evaluate and control the CO_2 emissions of their activity. These tools can be the improvement of classical supply chain models by associate carbon footprint parameters (Benjaafar, B. Yanzhi, L. Mark, D. (2010)), or the creation of new tools like the Bottom – up life cycle goods based on Process Analysis (PA) or the Up – Bottom approach with Input-Output (EIO) (Tukker, A. and Jansen, B. (2006)).

However, in this literature review, no tools engaged the whole company workers in the reduction of their CO_2 emissions and where only addressed to the decision makers. Also, whereas it is critical, observations prove that the engagement of employees in the reduction of their CO_2 emission is poor today. What factors does explain this poor engagement and what tool is it possible to implement to engage more efficiently the employees?

The first part of this dissertation will consist in a picture of all the legal and consumer pressure a French business has to face front of the CO_2 reduction issues. The second part will focus on the barriers that prevent employees to decrease their CO_2 emissions at the office. The third part, which is the intelligent fruit of the two previous one, will present a solution for businesses which integrate the legal andworker environment for engaging all employees in their CO_2 reduction.

CO_2 EMISSIONS : A NEW CHALLENGE FOR CORPORATIONS

A) The creation of a global governance regime to limit the global warming

The United Nations Framework Convention on Climate Change (UNFCCC) process aimsto manage the climate as a public good that is available for all humans through a global governance regime. (Zou, J. Fu, Sha. (2015)). This new governance will probably define quotasof CO_2 per countries that will be then sub-divided per industries and companies. In a close future so, companies will have to directly deal with their CO_2 emission to avoid taxes or penalties.

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B) *How companies deal with CO_2 emission reductions?*

According a survey done on 31 US major companies, take actions about climate related strategy became important among companies for 1. Increase profit (Energy efficiency, Operational improvement, cost saving) 2. Influence government regulation 3. Enhance corporate reputation (Hoffman, A. (2016)). Develop climate strategy also became critical about financing. 93% of investors'think about climate change risk in their investment decisions and it has been proved that firms with superior CSR performance enjoy a subsequent reduction in the cost of capital equity (Dhaliwal, D. Zhen Li, O. Tsang, A. 2010) and subsequent ease to hire talents (Brekke, K. Nyborg, K. (2007)).Companies try to transform the global warming threat as a competitive advantage (Porter, E. Kramer Mark, R. (2006)).

C) *The current barriers that prevent employees to decrease their CO_2 Emissions*

Employees are emitting CO_2 during their working time and in the realization of their missions. These emissions can becategorized in the Scope 3 that are defined as other indirect emissions, such as the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, electricity-related activities. Scope 3 emissions represents in average 50% of a company carbon footprint.

Because these emissions are directly control by employees of a company it is crucial to better engage them in the reduction of the carbon footprint. However today, a lot of study show that employees face many barriers that prevent them to adopt a pro-environmental behavior.

a. *Introduction*

Why do people act environmentally and what are the barriers to pro-environmental behavior? Numerous theoretical frameworks have been developed to explain the gap between the possession of environmental knowledge and environmental awareness, and displaying pro-environmental behavior. To summary, the factors that have been found to have some influence, positive or negative, on pro-environmental behavior are demographic factors, external factors (e.g. institutional, economic, social and cultural) and internal factors (e.g. motivation, pro-environmental knowledge, awareness, values, attitudes, emotion, locus of control, responsibilities and priorities). (Kollmuss, A. Agyeman, J. (2002))

b. *Why environmental knowledge does not lead directly to pro-environmental behavior? The Rajecki model*

By 'pro-environmental behavior' we simply mean behavior that consciously seeks to minimize the negative impact of one's actions on the natural and built world (e.g. minimize resource and energy consumption, use of non-toxic substances, reduce waste production).Rajecki (1982) defined four causes that prevent an individual to adapt his behavior to his new environmental knowledge.

- Direct versus indirect experience: Direct experiences have a stronger influence on people's behavior than indirect experiences. In other words, indirect experiences, such as learning about an environmental problem in school as opposed to directly experiencing it (e.g. seeing the dead fish in the river) will lead to weaker correlation between attitude and behavior.
- Normative influences: Social norms [3], cultural traditions, and family customsinfluence and shape people's attitudes, e.g. if the dominant culture propagates a lifestyle that is unsustainable, pro-environmental behavior is less likely tooccur and the gap between attitude and action will widen.
- Temporal discrepancy: Inconsistency in results occur when data collection forattitudes and data collection for the action lie far apart (e.g. after Chernobyl, an overwhelming majority of Swiss people were opposed to nuclear energy; yet a memorandum two years later that put a 10-year halt to building any newnuclear reactors in Switzerland was approved by only a very narrow margin).Temporal discrepancy refers to the fact that people's attitudes change overtime.
- Attitude-behavior measurement: Often the measured attitudes are much broaderin scope (e.g. Do you care about the environment?) than the measured actions (e.g. Do you recycle?). This leads to large discrepancies in results (Newhouse,1991).

c. *Why environmental knowledge does not lead directly to pro-environmental behavior? The Hins model*

In 1986, Hines, Hungerford and Tomera published their Model of Responsible Environmental Behavior which was based on Ajzen and Fishbein's theory of planned behavior (Hines et al., 1986–87; Hungerford & Volk 1990; Sia et al. (1985–86). They did a meta-analysis of 128 pro-environmental behavior research studies and found the following variables associated with responsible pro-environmental behavior:

- Knowledge of issues: The person has to be familiar with the environmental problem and its causes.
- Knowledge of action strategies: The person has to know how he or she has to actto lower his or her impact on the environmental problem.
- Locus of control: This represents an individual's perception of whether he or she has the ability to bring about change through his or her own behavior. People with a strong internal locus of control believe that their actions can bring about change. People with an external locus of control, on the other hand, feel that their actions are insignificant, and feel that change can only bebrought about by powerful others.
- Attitudes: People with strong pro-environmental attitudes were found to be more likely to engage in pro-environmental behavior, yet the relationship between attitudes and actions proved to be weak.
- Verbal commitment: The communicated willingness to take action also gave some indication about the person's willingness to engage in pro-environmental behavior.
- Individual sense of responsibility: People with a greater sense of personal responsibility are more likely to have engaged in environmentally responsible behavior.

d. *Why environmental knowledge does not lead directly to pro-environmental behavior? The Fietkau model*

Fietkau and Kessel (1981) use sociological as well as psychological factors to explain pro-environmental behavior or the lack of it. Their model comprises variables that influence either directly or indirectly pro-environmental behavior.These variables are independent from each other and can be influenced and changed.

- Possibilities to act ecologically [4] (Verhaltensangebote). These are external, infrastructural and economic factors that enable or hinder people to act ecologically.
- Behavioral incentives (Handlungsanreize). These are more internal factors thatcan reinforce and support ecological behavior (e.g. social desirability, quality of life, monetary savings).
- Perceived feedback about ecological behavior (wahrgenommene Konsequenzen). A person has to receive a positive reinforcement to continue a certain ecological behavior. This feedback can be intrinsic (e.g. satisfaction of 'doing the right thing'), or extrinsic (e.g. social: not littering or recycling are socially desirable actions; and economic: receiving money for collected bottles).
- Knowledge (Wissen). In Fietkau's model, knowledge does not directly influencebehavior but acts as a modi.er of attitudes and values.

A SOLUTION OF WEB PLATFORM THAT COULD ENGAGE ALL WORKERS IN THE REDUCTION OF THEIR CO2 EMISSION

A) Introduction

This last part is the intelligent fruit of the two previous chapter of this paper. After the analysis of the new CO2 constraints for businesses and the description of barriers that prevent employees to engage themselves in the reduction of their carbon footprint we will propone here a web platform that help employees to act environmentally for the interest of themselves and for the interest of the business.

B. Method

The user experience of the web platform can be divided in three steps.

- The creation of a personal carbon footprint: The employee realizes a 15 minutes survey about his environmental behavior on his working time. The questions will focus on the transportation, purchasing and the utilization of electronic devices. At the end of the survey the employees can have access to the detail of his consumption. Ex: Martyna Lara; 800 kilo CO2/ year in transportation, 400 kilo CO2/year in purchasing and 20 kilo CO2/year in electronic devices. This type of survey already exists for the whole life of an individual (WWF carbon-footprint), however it is needed to be adapt this survey to focus on the working time.

- Selection of environmental actions: According to the previous answer of the employee, the web platform proposes an adapted set of actions to undertake. The employee decides to undertake this action or not and can directly see the impact of this change on his carbon footprint. Ex: Martyna decides to come by public transportation and not by car avoid 200 kilo CO2/year in transportation.

- Comparison of results with other employees and discussions: The employees can compare their results and the progressions of their carbon footprint with other workers. The best competitors have financial rewards.

C. Why these platforms fight the employees' barriers to act environmentally?

The next part is the list of the barriers that are broken by the web platform.

- Knowledge of action strategy and pro-environmental knowledge: The web platform deep dive the sources of consumption and it allows the employee to priorities his actions. It also provides knowledge through the environmental actions it proposes.

- Behavioral incentive: The behavioral incentive is double. First social (people can compare their results with yours) and second financial, the best reductions have a financial reward.

- Temporal discrepancy: A competition between employees is created and the workers are engaged during all the year. Also, the constant advancement of the reduction of their carbon footprint allows them to see the progression of their results in the time.

- Direct experience: The employee gives information about his own life and feel directly implicated in this CO2 emissions reduction. He can concretely see the impact of his actions

- Locus of control: The propositions of action presented by the web platform proof to the employee that easy action can be undertaken to decrease his CO2 emissions.

- Normative influence: The fulfillment of the survey and the engagement in the program will be mandatory and asked by the managers. The company could control the advancement of employees in the reduction of their carbon footprint.

D. Limits of the platform

The platform has two limits. The first one is the lack of control about the validity of actions undertaken by employees. The only source of control comes from the colleagues that can see if the action undertaken by the other employees. A solution need to be found to control it. The second one is the large approximations that are done by the survey.

CONCLUSION

We get here an interesting proposal to engage all workers in the reduction of their carbon footprint. The next step would be to develop the application and to test it in a company to observe if it concretely leads to more environmental actions.

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