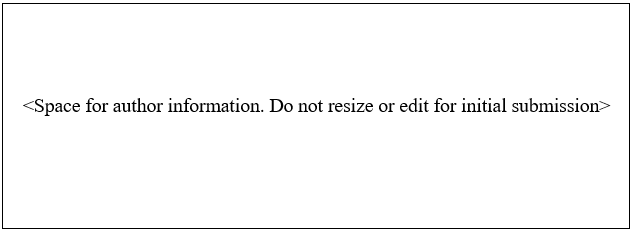
**PACIS 2021Paper Title**

*Research-in-Progress*

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**Abstract**

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那个template里面的格式自相矛盾了，示例文中二级标题是12号字体，结果要求描述说11号字体

# Introduction

There is a growing emphasis on global effects of various air pollutants, especially for greenhouse gases and notably CO2. Road vehicles are acknowledged to be significant sources of a range of pollutants. In 2018, they were responsible for 25% of total CO2 emissions from fuel combustion (IEA 2020). Among the many causes of road vehicle emissions, bad driving habits are one of them (Alessandrini et al. 2012; Van Mierlo et al. 2004). Then since the mid '90s, eco-driving has been developed as a new approach to driving, and nowadays it is a climate change initiative not to be overlooked (Alessandrini et al. 2012; Barkenbus 2010).

But it is far from enough to be satisfied with the help of initiatives or suggestions. With the development of Internet of vehicles (IOV), increasingly more organizations including government agents and IT companies are paying attention to leverage information technology (IT) to improve driving behaviors and cutting CO2 emissions.

It is acknowledged that the diffusion and deepening of the IT revolution is a hallmark of the emerging ‘information age’ (Castells 1997). And the rapid development of IT brings many gadgets with it, such as smartphones, personal computers, mobile apps and so on (Joorabchi et al. 2013; Mahmood et al. 2001; Nishad and Rana 2016). People use these IT products and applications for different purposes. And not surprisingly, as people use IT more frequently, researchers are studying the effects with growing interest (Greengard 2011).

Early studies have emphasized their positive applications including health promotion, education, business, communication, entertainment, and global connectivity (Chen 2020; Cole-Lewis and Kershaw 2010; Green and Bavelier 2008; Hitt and Brynjolfsson 1996). With the deepening of the research, a few researchers start trying to use IT to change human behaviors (Årsand et al. 2010; Hebden et al. 2012; Hughes et al. 2010; Mattila et al. 2009; Sundaram et al. 2007; Varnfield et al. 2011). However, there is a lack of its application on the purpose of environment protection. Thus, we planned to carry out a natural experiment to prove the drivers’ behavior changing and the environmental value of IT usage.

# Literature Review

## IT Usage and Behavior Changing

A typical objective of most prior IT research is to explain the factors influencing the IT usage or acceptance. In the last decades, researchers built and tested several theorical models of IT usage (Taylor and Todd 1995; Venkatesh et al. 2003). Another major objective of IT research is to assess its value, mainly in business. Studies shows that IT usage is a key driver of organizational performance and can effectively improve productivity (Devaraj and Kohli 2003; Hitt and Brynjolfsson 1996).

Meanwhile, only a few researchers have reported on the use of IT products and applications for individual behavior changing. Researches are usually found in some certain fields like public health and business. Mattila et al. tried to record self-management of weight-related behaviors (Mattila et al. 2009), Hughes et al. developed an app for monitoring energy balance (Hughes et al. 2010), and others have monitored diet or physical activity as part of a program for diabetes (Årsand et al. 2010) or cardiac rehabilitation (Varnfield et al. 2011). Sundaram et al. suggested that the effective and efficient use of technology enhances salesperson performance (Sundaram et al. 2007). According to Hebden et al., software applications (apps) used on mobile devices are a novel technology that can be used to deliver behavior change interventions directly to individuals and have the potential to make a difference (Hebden et al. 2012).

Actually, IT can change even more than that. As environment and sustainability have been supposed to become game-changing megatrends in the near future (Lubin and Esty 2010), new thinking and innovation is urgently required. Green IT is put forward in this context. Patricia Ordóñez de Pablos gives the definition that“Green IT is the systematic application of practices that enable the minimization of the environmental impact of IT and allow for company-wide emission reductions based on technological innovations.” (Ordóñez de Pablos 2012). It essentially covers two goals, including reducing the amount of emissions released by IT systems and infrastructure, and reducing the emissions from business and production processes with the aid of IT. Green IT benefits a lot, with its saving our money, improving energy efficiency, lowering greenhouse gas emissions, and so on (Erek et al. 2011; Loeser et al. 2011; Murugesan 2008).

Since there isn’t studies about the influence of Green IT usage on human behaviors, we plan to bridge the gap by discussing drivers’ driving behavior changes and the environmental impact of our app through an experiment.

## Driving behavior and CO2 emissions

CO2 emissions from road transport are of special concern, as they have been rising constantly (Gorham 2002). Some studies (Idso et al. 1998; Nasrallah et al. 2003) have measured and considered levels of CO2 to be representative of air quality similar to other pollutants that can have significant health effects (e.g. NOX, SO2, CO and PM10 ). In this respect, it is about time researchers researched on how to reduce CO2 emissions from road transport.

Except methods like better transport infrastructure, advances in vehicle technology and management systems (Nejadkoorki et al. 2008), only a few research showed that driving style has influence on greenhouse gas emissions as well. Alessandrini et al. have shown that women tend to consume and emit less than men because they push the accelerator pedal in a steadier way (Alessandrini et al. 2009). Gao et al. analyzed fuel consumption and NOx emission characteristics over various scenarios, and provided the guidance for eco-driving to achieve cleaner travelling (Gao et al. 2021). And Alessandrini et al. proves the influence of driving style on the environment by making an on road campaign, and adopting the tool developed by Centre for Transport and Logistics (CTL) (Alessandrini et al. 2012).

Therefore, one of the possible actions to reduce the environmental impact caused by road transport is to educate drivers to adopt a driving style that is as eco-friendly as possible. And we will use in-car sensor data to build regression models to see how each parameter relates to CO2 emissions.

# Natural experiment design

## Research hypothesis

把motivation theory\TAM什么的模型放在这部分

## Data collection

The goal of this work is to discover the impact of Green IT usage. Thus, we planned to choose CO2 emissions as dependent variable to show the drivers’ driving behavior changes and the environmental impact of the usage of our app, a product of Green IT.

*（下面这我用了过去时和现在完成时）*

The sample of vehicles monitored in the experiment has been selected from 63 different taxi drivers in xxx(公司). We obtained their driving data from July 2019 to October 2020 using On Board Diagnostic (OBD) systems, which have been incorporated into the computers on-board new vehicles to monitor vehicle components and driving behaviors in recent years. Meanwhile, we invited these 63 taxi drivers to use our software application (护驾宝就是“Hujiabao”吗？), which can send alert to them when it detects risky driving behaviors and can provide a driving behavior ranking at the end of the day. We used the drivers' check-ins in the app to identify whether they had used the software that day.

*(这里没有介绍数据特征，好像是要放在results里？——去除所有碳排放量为0，即缺失的记录项之后，得到11189 observations，21个变量。其中，为了保证正态性，将xxxx取logged data,更名为xxxxx。这些变量的缺失值用每个driver的每日数据均值替换。这里可以有个变量的表？但是21个变量确实似乎要缩减一点。).*

## ***Analytic strategy*** (这里有些细节我没有补充全，确定之后我尽快)

We planned to construct a linear regression model to investigate how the app usage and driving behaviors affect the CO2 emissions, as given next:

(+公式)

(这里解释公式)As described earlier, CO2 emissions *(或者这里写log\_co2\_1)*, being the dependent variable, is get directly through the OBD systems of a car per day. (+Xxxxxxx) is the independent variable. xxxx and xxxxxx are the moderate variables. We use the driver's personal features (gender, age, driving experience) as control variables *(这个是控制了这些，如果有什么问题后面再增删)*, and xxx is the idiosyncratic error term. Thus, we use Equation (1) to fit our data. The effect of aggressive driving behaviors and the app usage can be found by the sign and significance level of xxxx . The moderating effects are shown in the coefficients xxxxx. Further, we adopt xxxxx to verify the stability of the results.

Significance of the equation, each independent variable（*还是说contributing factor）* and coefficient was assessed using z tests and measured the effects of the presence of each independent variable on the strength of predictive relationships in the model. An α level of 0.05was adopted for our z test on each contributing factor. Analyses were conducted in 2021.

# Preliminary Results（看情况加）

# Conclusion

大概是过程中发现什么东西（要把那个显著性表放上去吗？），我们的实验进行到哪一步（这个地方倒可以介绍一下数据特征吧），future work还有哪些？

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