ESSA 2019 Biennial Conference

Examining the interaction between pedestrians and drivers: An institutional approach

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Abstract

In South Africa pedestrian deaths make up to 35-40% of road traffic deaths (Road Traffic Management Corporation, 2017). In order to determine the economic burden pedestrian-involved traffic incidents (PITI) can have on the economy the paper will examine the cost of PITIs. These cost estimations will be able to help determine the extent of policy interventions needed to reduce PITIs and will help to illustrate the importance of studying the causes of PITIs. Although studies on the causes of pedestrian-involved traffic accidents have been done across disciplines, including Psychology, Engineering and Economics there seems to be a paucity of studies on the interaction between pedestrians and drivers. As a second part to the paper, an Institutional Economics framework will be used to break the interactions down to the interaction between informal institutions (culture and values) and formal institutions (laws). To facilitate this an attempt will be made to see how pedestrians and drivers view the traffic law and whether they obey it. In addition to this, the paper will seek to determine how pedestrians and drivers view their own actions regarding pedestrian safety as well as how they view each other's actions with regards to pedestrian safety. The paper aims to provide a theoretical framework that would support further research into the subject. Finally, this paper will propose a case study approach for future research into these interactions.

JEL codes:

D02 - Institutions: Design, Formation, Operations, and Impact
K42 - Illegal Behaviour and the Enforcement of Law
L91 - Transportation: General
B52 - Current Heterodox Approaches: Historical; Institutional; Evolutionary

1) Introduction

In South Africa pedestrian deaths make up to 35-40% of road traffic deaths (Road Traffic Management Corporation, 2017a). These road traffic incidents place an economic and social burden on the economy and determining the causes of these incidents is crucial if a solution is to be found. While there may be many factors that determine a pedestrian-involved traffic incident (PITI) one thing that holds is that there is usually a driver and a pedestrian-involved in the situation. Because both of these actors are involved in examining the interaction between them as well as the interaction they have with the laws that govern road behaviour is a prudent step towards analysing the causes of PITIs.

The tools that will be used to analyse this interaction lies with New Institutional Economics. As a field of study, New Institutional Economics attempts to show the effect of institutions on economic outcomes with institutions providing a constantly changing incentive structure for the economy (North, 1991). One of the concepts that fall under this subject is the interaction between formal and informal institutions and it is this concept that the paper will use to examine PITIs. The paper aims to provide a theoretical framework that would support further research into the subject. The main theory is that there are informal institutions that are partly responsible for the high levels of pedestrian-involved accidents.

After introducing the concept of New Institutional Economics, the paper will first illustrate the severity of PITIs in South Africa. We will then introduce some causes of road accidents as well as the interventions involved in preventing these accidents. Only after trying to convince the reader that other factors such as infrastructure or enforcement cannot solely account for the high levels of PITIs in South Africa the paper will examine the role of informal institutions and the interaction between drivers and pedestrians. In conclusion we will briefly discuss an avenue for future research to make full use of the proposed framework.

2) The role of institutions

Institutional Economists see institutions as a way to coordinate transactions at a low cost. Institutions also indicate rights and duties to clarify who benefits and who pays for these transactions (Groenewegen, Spithoven & Van den Berg, 2010). As a field of study, New

Institutional Economics attempts to show the effect of institutions on economic outcomes with institutions providing a constantly changing incentive structure for the economy (North, 1991).

One of the factors that have long been thought to explain certain economic outcomes is values and norms or in other words, culture (Guiso, Sapienza & Zingales, 2006). However, culture has often been used as a catch-all phrase that included all of the unknown determinants of an outcome (Acemoglu & Johnson, 2005). If the results of a study are unexpected then it is easy to postulate that the reason for it is simply cultural, especially since it can be hard to define all of the components of culture.

One way to form a more definite way of thinking about culture is to first split institutions into two groups, formal and informal institutions. According to Groenewegen *et al.* (2010), formal institutions are:

> *"[P]ublic rules of behaviour that are designed by a public authority with legislative power and enforced by a public authority with executive power as well as a judiciary power that has the right and the power to penalize an individual or organization for breaking the rule."*

This would include institutions such as the law. On the other hand, Groenewegen *et al.* (2010) define informal institutions as:

> *"[P]rivate rules of behaviour that have been developed gradually and spontaneously and do not need any legal enforcement because the rules are sanctioned by the private parties themselves or because it is in the self-interest of the actors to follow the rules of their own accord."*

These informal institutions are then what is usually called norms, values or culture. Even with clear definitions, it is not always easy to determine what the influence of these institutions is or how they interact with each other. It is for this reason that case studies are often used to try and find a clearer understanding of these relationships. For such a case study one wants to study something where there is a difference between the normative and the positive outcome, or where people seem to act in a way that is not rational. The paper makes the argument that the actions of people who use the road, whether it is pedestrians or drivers often meet these standards. Specifically, the paper will look at the interaction between drivers, pedestrians and the law with the starting theory that the informal institutions that drive these interactions contribute to the high number of pedestrian-related road accidents in South Africa. Before

delving into the interactions between formal and informal institutions, the paper will first try to illustrate the severity of pedestrian-related road incidents in South Africa.

3) The cost of pedestrian accidents: the salience of human life

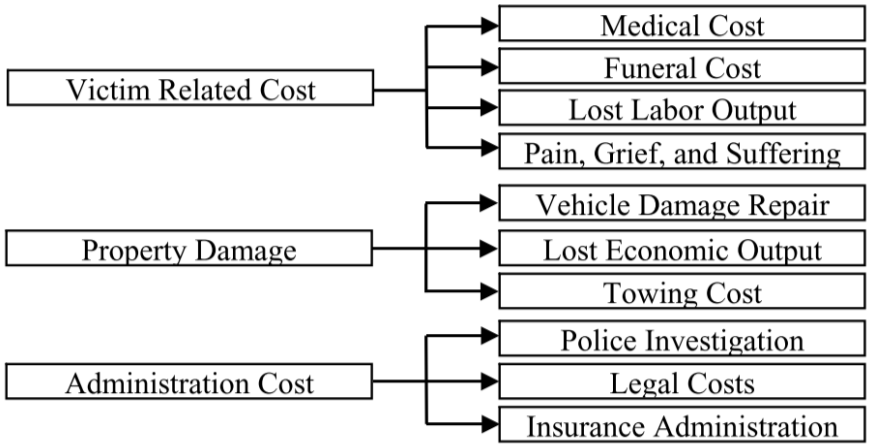
Even though the primary aim of this paper is to introduce an institutional economics framework that can be used to examine the interaction between pedestrians and drivers it is necessary to justify why this goal exists. The reason for examining this interaction is simply put to eventually reduce the cost of pedestrian-related road accidents. This statement may raise a few questions. Are pedestrian-related road accidents a problem? When the paper mentions these "costs" what does it mean and how is it calculated? This section will attempt to address these questions.

Our first step is to examine some statistics that are relevant to the South African situation. According to the World Health Organisation, 90% of the world's road traffic fatalities occur in lower to middle-income countries, with non-motorised road users such as pedestrians and cyclists making up half of these deaths (World Health Organisation, 2015:9). In South Africa pedestrian deaths make up to 35-40% of all road traffic deaths (Road Traffic Management Corporation, 2017a) and 35% of these deaths are children under the age of 17 (Koekemoer *et al.*, 2017:202). From these statistics, it is clear that the problem of road traffic accidents and fatalities for pedestrians is strikingly large.

Although the aforementioned statistics make the prevalence of PITIs in South Africa easy to understand the costs of these accidents are not so easily determined. It seems obvious that there are economic as well as social consequences of accidents, but how can this be quantified? In truth, there is a myriad of methods to calculate these costs. Two of these methods seem to be especially prevalent in the literature.

One of these approaches is the Human Capital Approach, also known as the Gross Output Method. The human capital approach includes various kinds of costs such as victim-related costs, property damage and administration costs, all which are decomposed in Figure 1 (De Leon, Cal & Sigua, 2005:3185). According to Sugiyanto & Santi (2017:107), the human capital approach is specifically suited to cases where human safety is at stake and one is looking for aggregate numbers within a country.

Figure 1: Asset Cost Components (De Leon *et al.*, 2005)



The other method is the Willingness to Pay (WTP) method. This is an ex-ante approach that places value on what people are willing to pay to avoid risks on roads such as death or injury (Giles, 2003). The WTP approach seems to be the best theoretical way to accurately attach a value to human lives. However; proponents of the HC approach argue that the data collection for this approach is easier and cheaper. The results of this approach are also more consistent (Alrukaibi, Alotaibi & Almutairi, 2015:47). A hybrid of the human capital approach was used to estimate the costs of crashes in South Africa. According to this estimation, road accidents cost South Africa up to 3.5% of GDP (Labuschagne, De Beer, Roux & Venter, 2016). Given the previously mentioned statistic that 35%-40% of these deaths involve pedestrians a rough estimation of pedestrian costs would be that 1.2%-1.4% of GDP is being lost due to pedestrian-related accidents specifically. Taking into account that this percentage only includes the cost of fatal road accidents the value including accidents that led to injury or other damages would be much higher.

Up to this point, only two of the most popular methods of cost calculation was mentioned and even within these methods, there are variations (Sugiyanto & Santi, 2017). An example of yet another approach to road traffic incident cost calculation is to use the burden that road accidents place on hospitals to determine costs. This was done by Herman, Ameratunga & Jackson (2012:487) who found that for Pacific countries up to 40% of all deaths in hospitals are caused by road traffic incidents with pedestrians being more vulnerable to death before hospitalisation than motorists. In line with this Bambach & Mitchell (2015:180) uses aggregated hospital data to estimate the personal injury recovery cost of a road traffic incident victim. Their study excluded costs of fatalities and focused on costs of recovery such as hospital costs, costs of

rehabilitation and medication and income loss. The costs for recovery by pedestrians was one of their four highest categories and was calculated as $399 000 Australian dollars for the period 2003 to 2009.

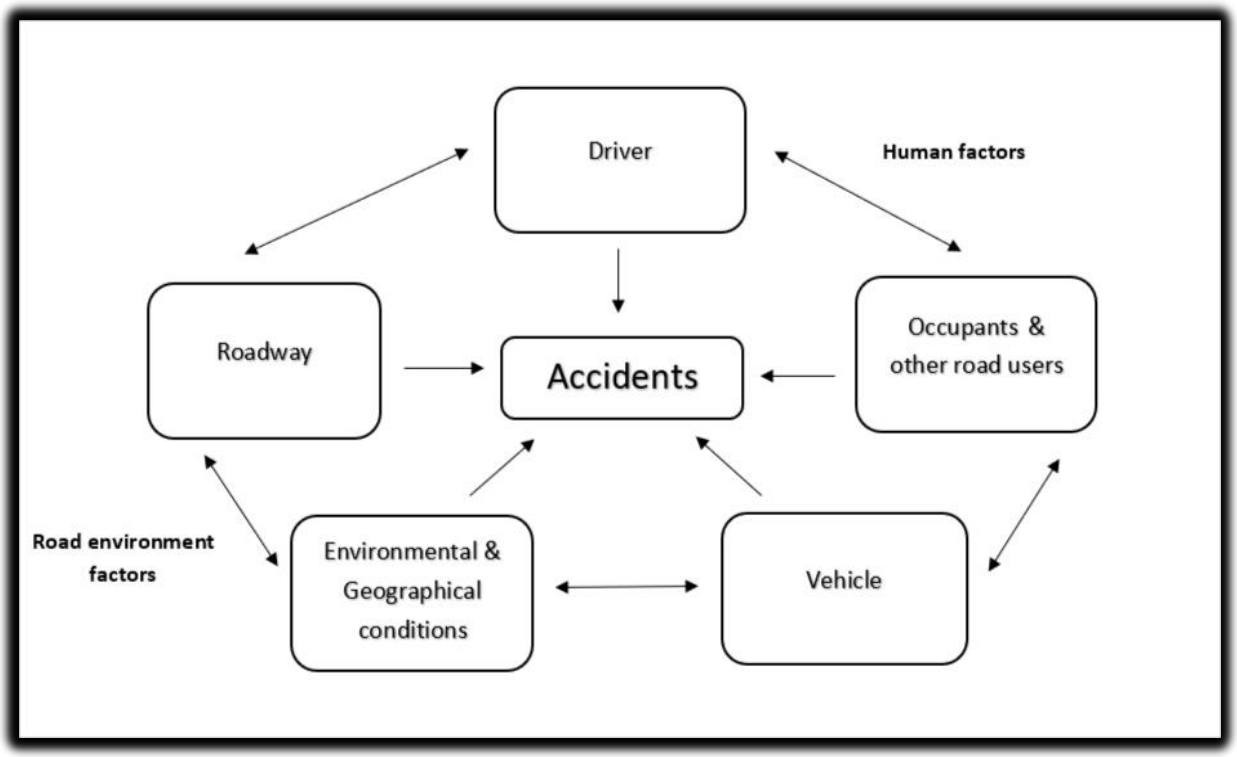
The various approaches to the calculation of costs can make it challenging to make comparisons between studies. Nonetheless; if one was to focus on a specific country or case it will be useful for informing policy measures. Especially if one uses individualised cost calculations taking into account the specific factors influencing road traffic incidents for that case. Quantifying the costs of pedestrian-related accidents for a country will enable policymakers to make comparisons across different policy areas. This will help them to move resources to the places that need it the most. Calculating the costs will also emphasise the need for pedestrian safety from an economic perspective and help to determine the economic and social returns on infrastructure improvements that promote pedestrian safety (Wijnen & Stipdonk, 2016:97). Our next step will be to discuss some of the causes of road traffic incidences that have been identified in the literature.

4) Examining the causes of accidents

Given that road traffic incidents and pedestrian- involved road traffic incidents are a worldwide problem it comes as no surprise that there is a large literature on the causes of these accidents. Of course, many of these causes are examined to eventually find solutions to these problems. This section will provide a brief overview of some of the common causes of pedestrian-related accidents as well how these causes were studied. The reason why it is important to examine the methods of study is to provide a better idea of the types of interventions that can be suggested.

To provide some structure to the perceived causes of road accidents we will use the structure provided by Bayam, Liebowitz & Agresti (2005) since it has already been applied to the South African case by Verster & Fourie (2018). The factors causing road accidents are (1) drivers as well as (2) other occupants of the roads. Pedestrians fall into this second category and together with the drivers, they create the two factors that can be grouped as human factors. Other determinants are (3) vehicles, (4) the roadway and (5) environmental/geographical conditions.

Figure 2: Factors influencing accidents, adjusted from Verster & Fourie (2018)



The two road environment factors, the roadway and the environmental & geographical conditions are the two causes that are the most likely to be linked to a lack of proper infrastructure. One of the methods used to determine what kind of infrastructure would be needed to improve pedestrian safety is to model pedestrian behaviour at crosswalks or intersections. Many different models can be used to model what is in essence crowd movement in a spatial setting. The models include roadway factors such as the length of crosswalks and the distance between different crosswalks as well as driver-based factors such as the distance between cars or the number of cars at specific intersections. In the same way pedestrian walking speed, speed of crossing and the waiting time before crossing the road can also be incorporated into the models (Feliciani, Crociani, Gorrini, Vizzari, Bandini & Nishinari, 2017; Liu, Zeng, Chen & Wu, 2017). This means that these complex models, often used in the field of engineering capture environmental, driver and pedestrian factors.

The above description is a gross simplification of immensely complex literature, but it should be enough to give the reader an idea as to the inputs when infrastructure improvements are analysed. Alongside poor road surfaces and lacking road markings, visibility is one of the key causes of accidents in South Africa with 16.5% of accidents that can be attributed to roads and

the environment being caused by poor visibility. This lack of visibility is due to things like poor lighting or blind corners (Verster & Fourie, 2018). An argument can also be made that visibility is to some extent also a driver and pedestrian issue given that improved driver or pedestrian visibility can also reduce accidents (Kwan & Mapstone, 2002). Another human issue is alcohol consumption before or while driving or walking. Driving while drinking and walking while drinking is dangerous. While drunk drivers may be a blight on the roads, drunk pedestrians are often more vulnerable since they are more likely to sustain serious injuries than drivers (Dultz & Frangos, 2013). Speeding is another human factor that can lead to accidents and which renders pedestrians particularly vulnerable. Verster & Fourie (2018) found that human factors contributed to 79.6% of fatal road accidents in South Africa and that speeding caused 11.6% of these accidents with jaywalking causing a shocking 52.5% of these accidents. In other words, jaywalking accounts for 41.79% of fatal road accidents.

While the abovementioned literature is focused on driver and pedestrian actions the psychology literature asks questions as to the motivations that lead to these actions. The tool most commonly used to evaluate these motivations is the theory of planned behaviour (TPB). The theory of planned behaviour can be used to show the link between motivation and action. It does not only explain behaviour but provides insights int how to affect behavioural change (Forward, 2009). The TPB breaks actions down into three components: (1) Attitudes (Will the outcomes be positive or negative?). (2) Subjective norms (What are perceived social pressures?) and (3) Perceived behavioural control (What facilitates or stops the behaviour?) (Bamberg, Ajzen & Schmidt, 2010). Atombo, Wu, Zhong & Zhang (2016) find that the perceived control variable is often positively correlated with traffic violations such as speeding or reckless overtaking. The TPB has been shown to explain 23%-48% of the variance in the intention to commit speeding offences and up to 49% of the variance in road crossing behaviour (Evans & Norman, 1998).

These kinds of insights are often used to advocate for educational measures to be applied to create behavioural change (Forward, 2009). In a study funded by the South Africa National Roads Agency SOC Ltd (SANRAL) Van Dijk, Malan & Fourie (2018) find that school children make road crossing decisions based on their attitude towards behaviour when deciding to use a pedestrian crossing. They also find that children's unsafe crossing behaviour increases when their perceived control increased and that what children learn in the classrooms do not always carry over to practical behaviour.

Concerning the subject of infrastructure improvement and education as interventions, SANRAL has been involved in various projects to improve pedestrian safety (SANRAL, 2016). These projects range from infrastructure development to pedestrian-focused education programs. Another organisation that has been trying to improve road safety is Arrive Alive. They are focused on changing the behaviour of road users and are involved in advertisement campaigns to promote road safety as well as education programs (Arrive Alive, 2019). Regrettably, we are not able to determine the effects of these interventions. On the one hand, it is encouraging to see that the issue of pedestrian safety is acknowledged at a national level, but on the other, we can only ask how efficient current interventions have been.

All of the mentioned accident factors are quite well studied, whether it is in engineering, psychology or other fields of literature. In a review on specifically the modelling of pedestrian behaviour Papadimitriou, Yannis & Golias (2009) points out the lack of studies addressing the interaction between drivers and pedestrians. Another factor that is not always considered alongside the interaction between drivers and pedestrians is the institutional framework in which this interaction takes place.

5) Formal institutions and enforcement

The previous section identified some causes of road accidents in South Africa. We have also indicated that SANRAL and Arrive Alive has been actively introducing measures to reduce road traffic accidents. These interventions took place on an infrastructure as well as an educational level but given the prevalence of PITIs in South Africa it is questionable first how effective these interventions have been and also if these interventions have been enough. Another way in which a government can ensure a certain type of behaviour is through the use of formal institutions or laws. This next section will discuss the extent of traffic laws in South Africa, as well as the enforcement of these laws.

The various laws concerning traffic regulation and road use include The National Road Traffic Act, (Act 93 of 1996) and The South African National Roads Agency Limited and National Roads Act, (Act 7 of 1998) (Justice Project South Africa, 2018). The Constitution (Act 108 of 1996, as amended) allocates the responsibility of the creation and implementation of road traffic laws between the national, provincial and local governments (Du Plessis, Jansen & Siebrits, 2019). Because of this division of responsibilities, the Road Traffic Management

Corporation (RMTC) was established in 1999 to assist with the consolidation of these responsibilities across various departments (Road Traffic Management Corporation, 2017b)

The World Health Organisation has identified a few risk factors that can be addressed by implementing laws. Most of these risk factors only influence drivers, such as wearing seatbelts, motorcycle helmets or child restraints. However, some of these laws also indirectly influence pedestrians. As summarised by Du Plessis, Jansen & Siebrits (2019) South African has a strong set of laws to govern driver behaviour. Only 2 of the 9 pedestrian-related laws in the categories of speeding, drink driving, mobile phone use while driving and drug use while driving are not covered. This shows that according to international standards the laws that govern behaviour on South African roads, at least in terms of driver behaviour, are up to standard.

Although the laws in place meet international standards South Africa is only allocated a score of three out of ten in the *Global Status Report on Road Safety* when ranked for the overall ability to enforce regulations (World Health Organisation, 2015). Low levels of enforcement can lead to an increase of violations of the law since it undermines the credibility of the law (Acemoglu & Jackson, 2017:1). The current tool to improve levels of enforcement is the Administrative Adjudication of Road Traffic Offences (AARTO) Act (No 46 of 1998). The AARTO act has been in the wings for many years and has been signed into law in 2019. This act would allow the use of a demerit point system for road traffic violations which would hopefully improve the enforcement of existing traffic laws. The act should facilitate this improvement since it would reduce the burden on courts and provide greater incentives to obey the law such as the suspension of drivers' licenses for serial offenders (AARTO, 2019).

The implementation of AARTO will hopefully increase the ability to enforce laws on South African roads, but it is still only focused on the actions of drivers. Even the National Road Traffic Act, (Act 93 of 1996) does not mention the laws governing pedestrian behaviour. However, the repealed Road Traffic Act 29 of 1989 did mention the duties of pedestrians in sections 109 and 110 (Justice Project South Africa, 2018). It is, however, possible that there are laws concerning pedestrian-related behaviour at a provincial or municipal level. The fact that laws governing pedestrian behaviour are unclear is only made worse by the fact that unsafe pedestrian behaviour is often hard to detect and therefore to enforce. This is especially true for problematic cases such as jaywalking which in the previous section has been highlighted as one of the main causes of accidents on SA roads. It is also the case in South Africa that there is an inequality aspect that has to be considered since most regular pedestrians are from lower-

income groups and often do not have the necessary infrastructure to allow them to not break the law when making their way to work (Koekemoer *et al.*, 2017).

Since the formal institution governing pedestrian behaviour is weak and the enforcement of them is also lacking the need to examine the informal institutions become crucial. Before continuing it must be highlighted that there is an interaction between formal institutions, enforcement of formal institutions and informal institutions and that one cannot be considered without the other.

6) A strategy to investigate informal institutions

As shown by the literature on the theory of planned behaviour it is more than just the infrastructure and external factors that cause pedestrians to be involved in accidents. Since 79.6% of fatal road accidents are caused by human factors there is some unobserved factor that drives these extreme statistics. From section 5 we can conclude that even though driver-based laws are strong pedestrian-based laws could improve and that investigating the informal institutions may be able to shed light on the high levels of PITIs. It is in the current section that the paper will investigate the interaction between drivers, pedestrian and the law. The reason for this is to see whether the informal institutions driving these actions are partly responsible for the high levels of pedestrian-involved accidents.

Apart from the reasons mentioned above other authors have also found that informal institutions may be part of the reason for road accidents. A study in Australia found that education is not necessarily the problem since children are the rules of the road from a young age and that the fault must lie with the behaviour of the pedestrians themselves (Lennon, Williamson, King, Lewis & Haque, 2016). In some cases, such as with speeding, Hoekstra & Wegman (2011:82) shows that amongst young people stricter enforcement has almost no effect on reducing their propensity to speed.

To provide a theoretical approach of institutions that can be applied to the interaction between pedestrians, drivers and the law the paper will use the classification of informal institutions as suggested by Helmke & Levitsky (2004). However, we will adjust the approach slightly to make it more applicable to this case. The main adjustment is that all formal institutions that we refer to in this case will be laws since these are the most relevant formal institutions when dealing with behaviour on roads. Since the goal is to provide a framework for further research

it is, unfortunately, the case that conclusive results as to the interactions cannot currently be provided. The paper will provide suggestions as to such future research in the next section.

The first step would be to identify informal institutions. Helmke & Levitsky (2004) break the process into three questions. *Question 1: What are the shared expectations about the constraints that the actors face?* In other words, what are the laws as pedestrians and drivers perceive them? As we already confirmed laws for drivers are clearly defined, but not necessarily when it comes to their behaviour towards pedestrians. The laws that govern pedestrian behaviour is also unclear. Any study that is done based on this framework would have to determine the perception that pedestrians and drivers have with regards to the laws that govern them.

Question 2: To which community does the informal rules apply? For the sake of this paper, we will assume that the rules apply to South Africa in general. Any case study that is done on this matter will then narrow down the specific community that is being studied and would hopefully be able to extrapolate more general behaviour from this case in a credible manner.

Question 3: How are the informal rules enforced? This question is the most challenging one since according to the definition of institutions by Helmke & Levitsky (2004) informal institutions must have some enforcement mechanism. This mechanism can be subtle and in the form of gossip or ostracism. In the sense of informal institutions that pertain to driving and pedestrian behaviour, this is a hard question to answer and one that is not too obvious especially since we are trying to find informal institutions that contradict the formal institutions. Any research into this question would have to ascertain whether there is some social pressure to act in a certain way or perhaps some internal measure of enforcement. We can speculate that peer pressure is for example involved when jaywalking and that getting left behind by a group when you do not do it can be a form of punishment. The same exclusion can also be punishment for actors who do not drink and drive/walk or who do not speed. In the case of pedestrians crossing national roads to go to work, the punishment for not doing so may be that you are penalised for being late to work.

The second part of the Helmke & Levitsky (2004) framework we will use pertains to their division of informal institutions. They break informal institutions into four groups as can be seen in Table 2:

Table 2: A typology of informal institutions (Helmke & Levitsky, 2004)

Outcomes	**Effective formal institutions**	**Ineffective formal institutions**
Convergent	Complementary	Substitutive
Divergent	Accommodating	Competing

The explanation they provide for these groups are as follows: Informal and informal institutions can be *complementary*, which means that informal institutions improve the efficiency of laws and that actors believe that the laws will be enforced. In this case, informal institutions can strengthen laws. Informal institutions can also be *accommodating*. This means that actors may have reasons not to behave according to the law and instead of disobeying the law only disobeys the spirit of the law. This may not improve efficiency, but people may be accepting of the laws since they still get to serve their interests. They can also be *competing* which would be the case when laws are not enforced well which allows actors to ignore them. The informal institutions are not in line with the laws which can make the laws ineffective. *Substitutive* informal institutions try to address the problems that the lack of formal rules cause and still have the same intent as the formal institutions.

According to this structure the behaviour of pedestrians and drivers when they disobey laws is due to competing informal institutions. Given that the laws and the enforcement thereof when pertaining pedestrians is not ideal substitutive informal institutions would probably have caused lower pedestrian-related road incidents. The idea that formal and informal institutions can clash is also supported by Pejovich (1999). Pejovich (1999) explains that informal institutions can strengthen formal institutions when they work together and that formal institutions can be weakened by informal institutions that are not in line with formal institutions.

Keeping in line with the title of the paper it may also be that it is not only the behaviour of drivers and pedestrians towards the law but also their behaviour towards each other that lead to high levels of accidents. For example, pedestrians may expect drivers to stop for them when they are crossing the road, even when it is not at a pedestrian crossing. In turn, drivers may feel that it is not their responsibility to stop. These "misunderstandings" may also be propagated by social norms and the fact that the laws on the matter are not clear would not help to clear up these problems.

Some of the previous work on the influence of informal institutions on road safety is focused on interventions to change behaviour. These behaviourally based interventions may take the form of nudges such as fear-based advertising (Lewis, Watson & Tay, 2007; Lewis, White, Ho, Elliott & Watson, 2017) or the use of social opinions (Hoekstra & Wegman, 2011; Lepenies & Małecka, 2015). Although there is pre-existing literature of the effect of informal institutions on road safety (Bradford, Hohl, Jackson & Macqueen, 2015; Hazen & Ehiri, 2006) little work is done on the interaction between informal institutions.

Overall, one would like to show some more concrete results than merely speculate as to the causes of PITIs using a theoretical framework. Unfortunately, the purpose of this paper was to provide the groundwork for further studies, but we will use the next section to conclude and to briefly introduce some future work that can be done to provide us with more definite results.

7) In conclusion: What lies ahead?

Given that we now have some theoretical framework that can be used to apply New Institutional Economics to pedestrian-involved traffic incidences we will look at a future avenue of research. To gain evidence as to the relationships between informal and formal institutions regarding PITIs we propose a case study using surveys. This method can also provide insight into how drivers and pedestrians interact with each other. Such a survey would have to cover both pedestrian and driver behaviour.

To facilitate this two separate surveys, one for drivers and another for pedestrians would probably be the most effective. The pedestrian survey would have to answer questions about pedestrian knowledge of the law, pedestrian expectations of enforcement, pedestrian adherence to laws and finally pedestrian opinions as to driver behaviour towards pedestrians. The driver survey will mirror this and determine driver knowledge about pedestrian related laws, driver expectations of law enforcement regarding behaviour towards pedestrians, driver adherence to laws and drivers' opinions of pedestrian behaviour.

The two-survey approach will allow data collection from pedestrians as well as drivers without answers to "pedestrian" questions influencing the answers on "driver" questions. The completed surveys should provide information that can be compared across driver and pedestrian groups. If there are any systematic differences between the two groups, it may indicate that the interaction between drivers and pedestrians lead to high levels or PITIs.

This basic proposal suggesting a starting point to future research marks the end of the paper. The paper has shown that pedestrian-involved traffic incidents are a far-reaching issue that has multiple causes. We then argued that due to uncertainty about pedestrian-related traffic laws and weak enforcement the role of informal institutions in causing pedestrian-involved traffic incidents should be examined. Further application of New Institutional Economics provides us with a framework to determine what these informal institutions may be and we conclude that it is likely that competing informal and formal institutions contribute to the high level of PITIs. We make the point that differences in the way pedestrians and drivers behave towards each other may also add to the incidence of pedestrian-involved traffic incidents. With this, the paper introduced a theoretical framework that can be used for future research on pedestrian-involved traffic incidents and the interaction between pedestrians and drivers.

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