

SEL-SB Model: A Model for Taxi Drivers' Traffic Safety Culture Using Grounded Theory

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Research

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Abstract

Background: The average number of accidents in professional drivers is higher than other drivers. These people's driving safety culture is likely different from others. Since there is little evidence about taxi drivers' safety culture, the emergence of related factors is valuable to be explored as a basic model. Therefore, the present study aimed at providing a model for explaining the affecting factors of the taxi drivers' safety culture in Iran based on Grounded Theory (GT).

Method: This research was exploratory research aimed at explaining the factors affecting the safety culture of taxi drivers in Iran (Zanjan) and presenting a theoretical model. To this end, 26 IDIs were conducted with 12 taxi drivers and 14 others that were directly or indirectly involved with taxi drivers who were selected by theoretical sampling. Furthermore, in order to validate the themes resulted from the study and to gain a deeper understanding, an FGD containing six taxi drivers was held. According to the process suggested by Corbin and Strauss, the grounded theory method was used to interpret the collected data.

Results: The results of this study brought SEL-SB model based on five emerged themes for the safety culture of taxi drivers, including stewardship and governance, law manifestation, socio-cultural profile, economic pressure, and safe behaviors. The axial theme of stewardship and governance was quite prominent. Participants emphasized factors such as the need for increased management commitment, cross-sectoral collaboration among traffic-related organizations, and quality of public transport services.

Conclusion: Improving the driving behaviors of taxi drivers calls for understanding the way how they perceived traffic safety culture around them. The SEL-SB model emphasizes the need to dramatically organizational changes in the traffic-related organization in order to taxi drivers' safety culture.

Introduction

Road traffic safety is a global issue. According to the World Health Organization's report (WHO 2018), about 1.35 million people globally die in traffic accidents, and also, between 20 to 50 million people suffer from non-fatal injuries annually due to traffic accidents (1). Most of these deaths and injuries occur in developing countries such as Libya and Iran (2). In Iran, 27.4 deaths per 100,000 people occur, and approximately 6% of GDP is annually lost due to road accidents each year (1). Global organizations' predictions do not show bright horizons in this regard, too. The World Health Organization (WHO) and the World Bank have estimated that the fatal traffic crash in high-income countries will drop by 28 percent over the next two decades, while in moderate or low-income countries, it is expected to increase from 92 to 147 percent (3). With a close look at the decade of action for road safety (2011–2020), it is clear that contrary to the support provided by this program, less developed or developing countries are too far away from the sustainable development goal of 3.6 for by 2020 (4). Therefore, proper planning to reduce the impact of this socioeconomic phenomenon is essential for the country.

On the other hand, research has indicated that the average number of accidents in professional drivers is higher than other drivers (5–9). However, the risk of traffic accidents among professional drivers is not equally divided (9). International studies have shown that the risk of accidents in taxi drivers is higher than the others (10–13). Taxi drivers are one to two times more likely to be involved in crashes. However, there is little evidence about taxi drivers' perceptions of safety, as well as, little research has investigated the degree of engagement of this group in inappropriate driving behaviors (13). The people's attitudes, understanding, beliefs and behaviors towards safety are the conceptual manifestation of safety culture. Safety culture contains meanings, interpretations, attitudes, values, beliefs, rules, and procedures towards safety within a community (14).

Weick (2001) emphasized the development of safety culture as a precondition for coordinating activities through common values, meanings, and symbols (15). Studies also suggest that safety culture plays a major role in encouraging people to perform safe behaviors. The concept of safety culture can be generalized to traffic safety, too (16). Nowadays, the impact of traffic safety culture on increasing the efficiency and traffic quality indicators has been underlined (17). Hence, there is an increasing interest in "safety culture" to reduce traffic accidents (17, 18). Safety culture is a concept that cannot be easily measured due to its inherent complexity. However, like material systems, it can be modeled, analyzed, and engineered (19). Modeling safety culture is the only way to achieve a tool for measuring this complex concept (20).

The main goal of the study is to determine the factors that can affect taxi drivers' safety culture. Despite the multitude of non-Iranian safety cultural models, the use of these models in Iran does not seem appropriate. Scientific literature has demonstrated that cultural models in Western countries have presented a poor performance in other cultural contexts (for example, Asia) (21). Also, the relatively new Iranian models are in non-traffic areas, which cannot fully describe the factors influencing traffic safety culture. Qualitative research can be used to provide a model. Qualitative researches use qualitative data such as interviews, participatory observation, documentation, etc. for understanding and explaining the complex social phenomena. Understanding of safety culture depends on the comprehension of its complexity. Despite many literatures attempted pertaining to safety cultures, it is almost a less known phenomenon. Therefore, it is not surprising; there isn't still a consensus on its components, model, or even a definite definition. All these aspects, however, can be expressed using Grounded Theory (GT). It is why GT was taken for conducting this study (22).

The present study was aimed at providing a model for explaining the affecting factors of the taxi drivers' safety culture in Iran based on the GT method.

Research Design

This research was exploratory research aimed at explaining the factors affecting the safety culture of taxi drivers in Zanjan, and developing a model. The grounded theory (GT) method was used to interpret the collected data. For this purpose, the interviewer (MM) received professional training from the other two

authors who were experts in conducting the interviews and had rich experiences in this field. MM conducted a few interviews under the supervision of the experts and learned from her mistakes and finally got ready for conducting interviews by herself.

In the beginning, purposeful sampling was applied and then followed by theoretical sampling. There were no previous acquaintances between the interviewer and the participants. They were all asked to speak about traffic safety culture in replies to the following open-ended and non-directive questions. In the beginning, for the convenience of the participants, the interviewer asked some ice-breaking questions such as: "can you tell me all about a normal day of your driving.", "please explain a special experience in your driving.", "What comes to your mind when you hear about traffic safety culture?", "What should be done for promoting a positive traffic safety culture in Zanjan?", "Imagine that at some point in the future, taxi drivers in Zanjan will be able to have a high-ranking safety. What would be changed?", "How can it impact on your safety?", "Would you please explain more?".

During the interview, the interviewer paid enough attention to the facial gesture, body language, the psychological atmosphere, and the tone of speaking of the participants and wrote it down in a memo notebook to take it for further consideration in interpreting the data.

Data collection was carried out simultaneously with continuous analysis after the first interview and it was done using semi-structured interviews, focused group discussions, and observation with field notes. Interviews continued until saturation point when it encountered repeated data. Theoretical sampling with back and forth between sampling and analysis continued until the researchers reached theoretical saturation in which new findings were ceased to emerge.

Participants

Initial interviews were conducted with taxi drivers, the researchers analyzed the data; all individuals who based on the findings could comment on the behaviors of taxi drivers in Zanjan and the reasons for such behaviors were selected and interviewed. But for this group of participants, the mentioned questions were somewhat moderated.

Therefore, a total of 32 participants voluntarily took part in the study, including 18 taxi drivers, two taxi organization's staffs, a traffic police officer, two traffic police authorities, three pedestrians and passengers, an ordinary driver, an agency driver, a bus driver, a bus organization's authority, a school service driver, a transportation organization's. They had different educational levels, ranging from illiterate to university graduated. The participants' age, also, varied from 23 to 73 years old. The demographic characteristics of the participants were represented in details in Table 1, 2 and 3.

Table 1
Demographic characteristics of taxi drivers participated in IDIs

Participants	Age (years)	Educational level	Work experience (years)	Driving experience (years)	Abbreviation
Taxi driver 1	34	Junior high school	3	14	P1a34-JHS-TD-IDI
Taxi driver 2	47	Junior high school	26	29	P2a47-JHS-TD-IDI
Taxi driver 3	35	Elementary school	16	17	P3a35-ES-TD-IDI
Taxi driver 4	49	High school	24	30	P4a49-HS-TD-IDI
Taxi driver 5	35	University postgraduate	3	17	P5a35-UPG-TD-IDI
Taxi driver 6	36	Junior high school	15	17	P6a36- JHS -TD-IDI
Taxi driver 7	43	Junior high school	25	25	P7a43-JHS-TD-IDI
Taxi driver 8	51	Junior high school	23	32	P8a51-JHS-TD-IDI
Taxi driver 9	50	University graduate	15	31	P9a50-UG-TD-IDI
Taxi driver 10	34	Junior high school	5	16	P10a34-JHS-TD-IDI
Taxi driver 11	46	High school	10	20	P11a46-HS-TD-IDI
Taxi driver 12	65	Reading and writing	8	20	P12a65-RW-TD-IDI

Table 2
Demographic characteristics of the participants selected by theoretical sampling in IDIs

Participants (occupation)	Age (years)	Educational level	Work experience (years)	abbreviation
Taxi Organization's Staffs 19	38	University graduate	14	P19a38-UG-TOS-IDI
Taxi Organization's Staffs 20	50	University graduate	25	P20a50-UG-TOS-IDI
Police Officer 21	26	high school	9	P21a26-HS-PO-IDI
Police authorities 22	51	University graduate	20	P22a51-UG-PA-IDI
Police authorities 23	29	University postgraduate	13	P23a29-UPG-PA-IDI
Pedestrian and passenger 24	43	high school	-	P24a43-HS-PP-IDI
Pedestrian and passenger 25	34	University graduate	-	P25a34-UG-PP-IDI
Pedestrian and passenger 26	25	high school	-	P26a25-HS-PP-IDI
Ordinary Driver 27	50	Junior high school	-	P27a50-JHS-OD -IDI
Agency Driver 28	73	Elementary school	8	P28a73-ES-AD-IDI
Bus Driver 29	55	Reading and writing	20	P29a55-RW-BD -IDI
School Service Driver 30	42	University graduate	14	P30a42-UG-SSD-IDI
Bus Organization's Authority 31	47	Junior high school	21	P31a47-JHS-BOA-IDI
Transportation Organization's Management 32	28	University postgraduate	3	P32a28-UPG-TOM-IDI

Table 3
Demographic characteristics of taxi drivers participated in FGD

Participants	Age (years)	Educational level	Work experience (years)	Driving experience (years)	Abbreviation
Taxi driver 13	33	High school	13	15	P13a33-HS-TD-FGD
Taxi driver 14	53	University graduate	3	34	P14a53-UG-TD-FGD
Taxi driver 15	23	High school	2	5	P15a23-HS-TD-FGD
Taxi driver 16	45	High school	16	25	P16a45-HS-TD-FGD
Taxi driver 17	40	Junior high school	12	20	P17a40-JHS-TD-FGD
Taxi driver 18	56	Reading and writing	29	33	P18a56-RW-TD-FGD

Data Collection Methods

Following the Zanzan University of Medical Sciences ethics committee's approval, the study was conducted by collecting data using two methods of individual in-depth interviews (IDIs) and a focused group discussion (FGD).

Individual In-depth Interviews (idis)

Taxi drivers who came to the organization (for other reasons) were requested to participate in the study by MM. Therefore, interviews were conducted with those who were volunteered. Based on theoretical sampling, IDIs were conducted with 12 taxi drivers (Table 1), and 14 others (Table 2) who were directly or indirectly involved with taxi driving. Table 1 and Table 2 show the demographic characteristics of the participants in IDIs. Every IDIs lasted between 27–116 minutes (M: 53/8, SD: 22/5). The variation of time was caused by the differences in the willingness of the participants to share their knowledge or to the extent of the importance of their answers and the possibility for further probe.

For the convenience of the participants, interviews were privately held in a quiet room, which was near to the TMO. First, the interviewer (MM) introduced herself to the participants and explained the purpose of the study. The respondents were assured of their anonymity and confidentiality. Participants were told that they could ask questions freely and leave the study whenever they wished. Each of the participants signed the informed consent before the interviews. With their permission, the interviews were recorded entirely by a voice recorder (Voice Recorder Olympus DS-2400).

By ending any interviews, the recorded voice was transcribed verbatim. Following several times of reading, meaning units were extracted and coded by all three authors. The process was repeated in more interviews until no new data could be found. Further interviews were performed based on theoretical sampling. It means, using the data derived from every interview analysis was used to identify the next potential interviewee.

A few first interview data clearly showed the necessity of interviewing with the TMO's staff. The final data has highlighted the roles of traffic police, drivers other than taxi drivers, passengers, and pedestrians.

Data analysis in MAXQDA software (version 10) was done simultaneously with data collection. Sampling was ended by the time that new data ceased to emerge.

Focused Group Discussion (fgd)

By ending individual in-depth interviews, a few participants invited to take part in a focused group discussion in order to validate the resulted themes and get a deeper understanding of the factors of the taxi drivers' safety culture. Six taxi drivers who had a homogeneous socio-cultural status were invited to FGD. After welcoming and accommodation, the interviewer (MM) introduced herself and explained the study to the participants.

All participants participated in the study signed a written consent before the interview. The demographic characteristics of the participants who come together in the FGD are shown in Table 3. The FGD was conducted in a small classroom at Zanzan University of Medical Sciences. The confidentiality of the information was assured, and the conversations were recorded with their permission. The FGD lasted for 110 minutes. At the end of the interview, a bonus was given to the participants in order to compensate for their working time spent on the interview. Fortunately, all of the themes and categories of IDIs confirmed by the FGD. Since data analysis in MAXQDA software showed no new codes, the FGD, data saturation was obtained. Consequently, no more interviews were done.

Data analysis

According to Corbin and Strauss (2008) (23), Gibson et al. (2012)(24), and Glaser and Strauss (1967) (25); data analysis consisted of four steps, which were followed in this study. All interviews were transcribed verbatim. Data was reviewed several times by all three authors. Each author independently extracted meaning units from the participants' descriptions. Then, the meaning units were summarized as long as codes emerged. During the continuous comparison process, all the authors sorted different emergent codes into subcategories and collating all the relevant subcategories, data extracts within the identified themes that were approved by all the three authors. In the final coding step, the data revealed the core theme of "stewardship and governance". Hence, this theme was coined as the main one, which impacts the safety culture of taxi drivers. Due to the relationship between the core theme and the others, the model of the taxi drivers' traffic safety culture (SEL-SB model) was presented. The table below

summarizes the subcategories, categories, and themes that emerged from the study. As shown in Table 4, 23 subcategories, ten categories, and five themes appeared in the study.

Table 4
Main sub-categories, categories, and themes (the summarized results)

Theme	Categories	Sub-categories	Meaning units
Stewardship and governance	Integrated road safety organization	Conflict on traffic-related organizations' performance	"There must be a single organization (in traffic safety). There are interferences between organizations, and in some cases they work in isolation. There are overlapping tasks, the traffic police agency and municipality passes the buck to each other, or sometimes similar task performed by both of them, causing organizations objecting with each other's action for parallel operations.... I work separately in this organization (traffic police agency), another works separately in the other one, these organizations have no connections at all. There is a need for a coordinating organization, an organization that undertakes all the tasks and responsibilities in the field of traffic safety, communicates responsibilities and receives feedback, thereby creating coordination and moving organizations in a direction to achieve the goal of promoting traffic safety culture, which is unfortunately not the case at present. " (P23a29-UPG-PA-IDI)
		Overlapping performance of traffic-related organizations	We had a traffic safety culture group containing several traffic organizations. But the group lacked political support and the power to pursue its approvals. For example, we saw that education administration did not show any interest. as they did not have much supervision to activate their workers in the traffic culture field. I think we should have an Integrated governmental organization called Traffic Safety Agency that have political support at the highest levels and have the power and resources for improving traffic safety culture. (P23a29-UPG-PA-IDI)
	Strategic planning and management	Management commitment	"Our problem is that the top authorities don't work well. All's well that ends well; only our working as low levels in the right way, can't make the coast clear in Zanjan; Authorities should understand us." (P14a53-UG-TD-FGD)
		Interdisciplinary collaboration	"I see that 50% of the problems stemming from the organizations; There's no denying that 50% of the problems come from the taxi drivers themselves, but the other half is rooted in traffic-related organizations. How can our organization (TMO) develop a traffic plan alone when the traffic police department does not cooperate with us?" (P20a50-UG-TOS-IDI)

Theme	Categories	Sub-categories	Meaning units
		Organizational strategy	<p>Because the organization (TMO) don't provide the necessary space and planning, the taxi driver himself is forced to plan and manage the affairs which make him tired. Fatigue, frustration, and lack of proper planning can cause stress and burden for taxi driver all of which are effective in the field of traffic safety. (P23a29-UPG-PA-IDI)</p> <p>Our thoughts on traffic are very short-sighted and not at all futuristic. That is, we do not see the future.</p> <p>(P23a29-UPG-PA-IDI)</p>
Law manifestation	Legislation	Legislation	<p>There may not be much public acceptance from drivers for attending traffic safety classes, but laws should be enacted to require drivers to attend these classes. And according to these rules TMO should plan to provide the groundwork for high drivers' participation and issue training certificates that are important to them and be recorded in the drivers' log books.</p> <p>(P23a29-UPG-PA-IDI)</p> <p>The rules regarding vehicle technical examination are not comprehensive at all, it is just enough for the car that its headlights and brake lights work properly so the leaf simply indicates that the car has no technical problems!!!(P11a46-HS-TD-IDI)</p>
	Law enforcement	Traffic surveillance and punishment	<p>Most of the red lights have (automatic control) cameras and they (the drivers) hit the red lights in places where there is no camera. (P8a51-JHS-TD-IDI)</p>
		Organizational Ethics	<p>It's (Zanjan is) a small city so the (traffic police) officer knows at least 10 percent of the people in the street... Whom he closes his eyes to their violations, which naturally brings down the level of safety culture. (P31a42-GS-BOA-IDI)</p>

Theme	Categories	Sub-categories	Meaning units
		Justice and Equality	<p>When a taxi driver see an unlawful private car carries passengers, it gets on his nerves ... It is likely to quarrel with the driver, cut him off, and slams his brakes, that I did it myself, several times." (P4a49-HS-TD-IDI)</p> <p>Let me say one thing about discrimination that I know of a taxi driver in Saadi intersection that stops right in the middle of the street to pick up or drop off the passengers. I have heard that his son or one of his relatives works in traffic police department, making it easy to stop in the middle of the street and doesn't give a way to any other drivers; So that he doesn't allow anyone else to pick up passengers until he fulfill his car's capacity. Now you can ask him if he paid a penny for driving violations? if I had been in his place, I would have not only had to sell my car to pay the fines, but also had to borrow some money and paid for the fines.</p> <p>(P3a35-ES-TD-IDI)</p>
Economic pressure	Occupational expenses	Taxi expenditures	<p>Taxi drivers are broken. They are head over heels in debt; most of them owe to repair shops. They forced to get along on a shoestring. (P15a23-HS-TD- FGD)</p>
		Compete to attract passengers	<p>As the others (participants in the FGD) said, there is street racing because of the passengers. When a taxi driver sees a passenger, he doesn't see anything anymore and just wanted to catch up with him/her so he steps on it and waves through the crowd, cut off other drivers; hence you can see so many drivers stop to pick up a passenger." (P14a53-UG-TD-FGD)</p>
	Livelihood Concerns	Stability and adequacy of income	<p>Taxi drivers can't make both ends meet; so they have no choice but to work for 12 or even 24 hours a day, which can cause fatigue, distractions, putting him over the edge and his nerves get out of control ending up to accident, traffic congestion. This is the main reason. (P20a50-UG-TOS-IDI)</p>

Theme	Categories	Sub-categories	Meaning units
		<p>Undesirable Household conditions</p>	<p>The only problem a taxi driver can have is the economic problem. There are no emotional problems like that. Because in most cases they are kinder if they have satisfactory income. But if the taxi driver's income gets low, it makes him more nervous. Even we try not to bring these problems in home and family space, but unfortunately lack of sufficient income leads us to family problems. (P4a49-HS-TD-IDI)</p> <p>"It's every day concern. I can say that 99 percent of the accidents occur because of these day-to-day concerns and economic pressure." (P1a34-GS-TD-IDI)</p>
Socio-cultural profile	Cultural values	Taxi drivers beliefs	<p>I do not use a seat belt in the city as our city is small. When ... a taxi driver drives from the morning till night, it's very unconfutable to use a seat belt because he got a heat-rash on his back, developed waist pains and etc.... I personally do not believe in using seatbelt." (P3a35-ES-TD-IDI)</p> <p>Only God is the Provider. Everything that is destiny will happen. (P9a50-UG-TD-IDI)</p>
		Drivers' commitment to citizenship rights	<p>It is very important to respect someone's right. For example, we have no forgiveness, we do not respect each other's rights. At the intersections we fight for the right of priority. One says I should pass first The other sees it his/her own right (to pass). (P1a34-JHS-TD-IDI)</p>
		Ethics in Society	<p>Nowadays ethical values are gone. There is a lot on the street that a young driver has verbal and physical conflict with an old one because of an accident or picking up passengers. Unfortunately, as time goes on, the situation gets worse. (P10a34-JHS-TD-IDI)</p>
		Normalization of violations	Social reflection

Theme	Categories	Sub-categories	Meaning units
		Traffic chaos	<p>Let me tell you this, the traffic in our city is a mess. Nothing is in its own place. (P4a49-HS-TD-IDI)</p> <p>Our country has entangled almost in traffic melee, traffic chaos. (P23a29-UPG-PA-IDI)</p>
Behaviors	Unsafe behaviors of road users	Passengers' unsafe behaviors	"The one who is waiting for a taxi is expecting to arrive soon so they put pressure on the driver, sometimes passengers say that they are in hurry and make the driver to reach their destination quicker.... the passengers' pressure causes the driver to violate the traffic rules." (P4a49-HS-TD-IDI)
		Pedestrians' unsafe behaviors	"Only pedestrians make traffic congestion in that intersection; It's not caused by the cars. They (pedestrians) don't yield. They don't pay attention to traffic light and right of the way they just cross the street anyway." (P7a43-GS-TD-IDI)
		Motorcyclists' unsafe behaviors	In my opinion, the most common cause of taxi accidents are motorcycles; they suddenly cut you off." (P12a65-RW-TD-IDI)
		Bus drivers' unsafe behaviors	If you take a look at the traffic situation on the traffic cameras, you will notice how much a bus can create a traffic chaos, whether in bypassing the streets, picking up/dropping off the passengers, in giving way or not giving way to other drivers. Even you can see that the bus drivers racing each other on a street. I think bus drivers are more likely to cause traffic jams in the city. Buses need to be organized and only pick up/drop off the passengers at their own stations. (P4a49-HS-TD-IDI)
		Private car users' unsafe behaviors	<p>I myself usually cross the speed limit; but in places that it needs I over speed. (P32a28-UPG-TOM-IDI)</p> <p>For example, A few minutes ago I fined a car which was parked in a taxi station. (P21a36-HS-PO-IDI)</p>

Theme	Categories	Sub-categories	Meaning units
	Taxi drivers' unsafe behaviors	Taxi drivers' violations	<p>Taxi drivers are notorious for slamming on the brake in the middle of the street. If you ask anyone they would say that they (taxi drivers) abruptly stop in the middle of street. It means that you should freak out driving behind them and keep as much as distance you can because they abruptly slam on the brake for example you can see he waves through the crowd and turn right and left in order to find passenger. As soon as seeing a passenger he can't see anything else and turn into a very dangerous driver. (P26a25-HS-PP-IDI)</p> <p>I'm frankly saying that I don't fasten my belt and wherever I see a police officer in 100 or 200 meter ahead I lay my hand and drag the seatbelt quickly, but I can't fasten it so much." (P3a35-ES-TD-IDI)</p>

Results And Discussion

A total of 32 participants voluntarily took part in the study, including 18 taxi drivers, two taxi organization's staffs, a traffic police officer, two traffic police authorities, three pedestrians and passengers, an ordinary driver, an agency driver, a bus driver, a bus organization's authority, a school service driver, a transportation organization's. They had different educational levels, ranging from illiterate to university graduates. The participants' age also varied from 23 to 73 years old. The coding offered that the influencing factors of taxi drivers' safety culture can be classified in 23 sub-categories, ten categories and, five themes (Table 4), which is described in details in the following section. The relationships between these themes were identified and represented as SEL-SB model (Fig. 1). The model consisted of the components of traffic safety culture namely Stewardship and governance, Economic pressure, Law manifestation, Socio-cultural profiles, Behaviours. The SEL-SB model describes taxi drivers' safety culture components and the relationships between them. This model can be considered in planning for road safety measures to promote traffic safety culture.

1 Stewardship And Governance

The most important theme that emerged from the data, which approximately most of the participants emphasized, was stewardship and governance. Stewardship means to plan and manage resources in order to achieve the desired goal in order to improve traffic safety culture, as well as to have a custodian to this improvement. Governance referred to the accountability in the highest levels of legislative and operational performance in the country in relation to a social phenomenon such as safety culture. This theme had been extracted from two categories of strategic planning and management, and integrated road safety organization.

1–1 Strategic Planning And Management

The participants believed that there was little coordination among sectors related to traffic safety. The powerful management and appropriate strategic planning were needed for organizing taxis and other cars in the city. Other studies had frequently emphasized planning for transportation and public health in order to manage traffic accidents in any community (26).

The management committee was also mentioned as the key factor in improving safety culture in different studies (27–29). The participants, however, referred to the lack of management commitment in traffic-related organizations, which can lead to traffic chaos and shaping a dangerous traffic environment. They also pointed to weaknesses in management, lack of commitment and accountability of organizations, negligence, and the reluctance of the authorities in addressing the current traffic situation. Some of the participants believed that if the relevant organizations and authorities fail to resolve the problem, the situation will get worse.

"in fact, we are repeating our words again. If the authorities do not support us ... no problem will be solved ... unfortunately in our society, everything is based on favoritism, rather than job competence..." (P16a45-HS-TD- FGD)

The results of the study showed that in order to improve traffic safety and facilitate public transport services, the relevant organizations should work together. The interviews emphasized the need for coordination and co-operation between different organizations.

According to Atkins and Granhed (2012), the organizational strategy is an important factor in the development and operation of road safety systems. Strategies determine the interests of the government, security objectives, the risks and challenges, and the likely responses of the community and organizations to these risks, as well as the structure of the national road safety system (27). This study showed the same results and underlined that organization strategy should target improve the traffic safety culture via establishing long-term organizational goals and objectives, sound information management, introducing accidents mitigation strategies, allocating funds to improve traffic safety, promoting thinking about safety in organizations, control over large numbers of unlawful passenger-carriers, considering a think tank for presenting new notions and design in traffic field, and so on.

"Why 17000 people are killing [on the roads] annually? We should have a strategic plan. Developed countries are implementing vision zero strategies, meaning that one death is unbearable, while if we could reduce 17000 deaths by 10% annually, we would be flying high." (P23a29-UPG-PA-IDI)

2 – 1 Integrated Road Safety Organization

One important result of the study was about the fact that there was no single organization in Iran with the overall power and responsibility to decide and regulate traffic safety activities. The participants stated

that similar tasks were performed by several organizations, and there was no clear allocation of tasks for some activities. This finding is in agreement with Khorasani-Zavareh et al.'s (2009), who worked on traffic injuries in Iran and showed that the most striking factor that emerged from their data was the "lack of a systematic approach to the safety of road users" (28). The interviews showed the need for an integrated road safety organization that would be created by government agencies to manage, plan, organize, coordinate, and perform activities and measurements in the area of traffic safety, and has the necessary authority to execute its plans. They criticized that there was no such an organization in Iran whose sole responsibility was to ensure implementing safety standards in planning, designing, and constructing the roads.

"There must be a single organization [in traffic safety]. There are interferences between organizations, and in some cases, they work in isolation.... There is a need for a coordinating organization, an organization that undertakes all the tasks and responsibilities in the field of traffic safety, communicates responsibilities and receives feedback.... " (P23a29-UPG-PA-IDI)

Based on the results of the current study and other similar studies, developing countries are usually facing a low level of traffic safety culture, as well as insufficient allocated funds for road safety projects. In these countries, the dominant approach to traffic safety is limited to reactive responses. If there is an organization responsible for traffic safety, it can improve traffic safety culture (29). Consequently, more effective approaches to traffic safety culture will be considered. Consistent with other studies, the results suggested that without reforming organizational structures and political processes, there will be no guarantee for proper control of high-risk behaviors, dangerous road conditions, and vehicle failures. Effective interventions are required for powerful organizational mechanisms. In the leading countries in road safety, safety has received the highest level of political support (30).

"A stereotypical word is spoken in every organization. How should safety culture be established? Culturalization costs: it costs more than the current budget allocated for this purpose. What you pay, what you get" (P23a29-UPG-PA-IDI)

2. Law Manifestation

One of the topics that were highlighted during the interviews by twenty-five of the participants was law manifestation. Law can contribute to the order of social life. It is a moral mirror that reflects lifestyle, social communication, values, and rights that govern behaviors in society (31). The results of the study showed that respect for the law and regulations was one of the determinant factors of traffic safety culture. Law manifestation is divided into two categories of legislation and law enforcement.

1-2 Legislation

The participants presumed weaknesses in the legislation as an effective factor in reducing road safety among drivers as well as taxi drivers' behaviors, which mostly referred to the inconsistency of subcultures with the road regulations, the impractical aspects of some traffic rules, and the inadequacy of technical examinations.

"According to Article 180 of the Driving Guidelines, the driver should not eat, drink, and speak while driving... for a taxi driver as a professional driver, compliance this Article for 10 hours daily is almost impossible." (P23a29-UPG-PA-IDI)

2-2 Law Enforcement

Participants emphasized the importance of monitoring and enforcement of traffic safety, strictness and inflexibility police surveillance, and relevant organizations such as TMO. Furthermore, some participants also considered the use of automated law enforcement technologies as an important tool for improving traffic safety. They also highlighted the importance of coherence of the training and enforcing the law in establishing safe driving behaviors.

"I can say the lack of supervision of the taxi organization makes us, the taxi drivers, stopping in the middle of the street. Because some people seize the stations." (P4a49-HS-TD-IDI)

The results of the study can be described by the deterrence theory. Deterrence theory, which has been derived from rational choice theory (RCT), suggests that increasing the likelihood of being penalized by strengthening automatic surveillance or traditional controls reduces the number of traffic accidents and subsequent injuries. one can say, therefore, the results are supported by the deterrence theory (32).

Participants highlighted other issues such as the feeling of violation of their rights, discrimination in law enforcement, and inequality in social services. The drivers described these issues as influencing factors in their frustration and dissatisfaction and found it to be effective in aggressive and dangerous driving behaviors. Other studies have shown that drivers find strong negative emotions in the face of road injustices. Especially if these acts considered deliberate and offensive. The common emotional response to these injustices is anger, which is associated with a sense of vengeance and the need to retaliate (33).

"When a taxi driver sees a private car [not taxi] unlawfully carries passengers, it gets on his nerves ... It is likely to argue with the driver, wraps the taxi in front of the car, and slams the brakes on, that I did it myself, several times." (P4a49-HS-TD-IDI)

3. Economic Pressure

The economic problems of taxi drivers were one of the major concerns and bad-tempered of the participants. Almost all of the participants stated that economic problems had caused taxi drivers to experience a

The results of our study showed a high level of financial stress among taxi drivers. Dealing with this stress, the participants committed driving violations. This finding is justified by the results of other studies, for example, De Coster (2005) identified law violations as a strategy for coping with stress. According to his study, it is likely that problems externalize in the form of anti-social behavior and law violations, which confirms the arguments of strain theories that describe the relationship between economic pressures and law violations (34).

3 – 2 Livelihood Concerns

Another thing that was announced by the participants was undesirable household conditions. The economic crisis and inflation had increased the cost of living; the inability to cover families' basic needs had put extra strain on taxi drivers, causing stress, anxiety, job dissatisfaction and, in turn, long working hours, fatigue, and competition for passengers ending up to unsafe driving behavior.

"It's an everyday concern. I can say that 99 percent of the accidents occur because of these day-to-day concerns and economic pressure." (P1a34-GS-TD-IDI)

Studies show that law violations of the s are related to economic dissatisfaction and economic concerns such as the inability to pay bills and debts. Such problems often affect employees and may describe the causes of law-breaking behaviors (38). The results of the study are in line with the classical strain theory suggesting that dissatisfaction with the economic situation can lead to monetary violations (35).

1–4 Cultural Values

Cultural values reflect some of the key features of national culture. The results of this study showed that factors such as taxi drivers' beliefs, driver's commitment to citizenship, and ethics in society sometimes directly or indirectly influence their unsafe behaviors. Beliefs including lack of trust in police and officials, the epidemic of non-compliance with traffic rules, religious beliefs, fatalism, optimism, false beliefs in the community, hopelessness to improve traffic conditions, etc. were among the factors expressed by participants. One of the beliefs stated by some participants was the feeling that taxi drivers owned the street. Participants announced that most taxi drivers thought the street belonged to them. Thus, they considered it is their right to display behaviors including passing the no-passing zone, disregarding the traffic lights, stopping at any desired location, and so on.

"Our colleagues think that because they are a taxi driver, they own the street. For example, they don't use the turn signal, suddenly pull over and pick up passengers, which is dangerous anyway." (P2a47-JHS-TD-IDI)

These beliefs would have an impact on increasing unsafe behaviors among taxi drivers. Both theories of social normative framework and expectancy violation theory (EVT) describe the results of the study. These theories suggest that to the extent that drivers misunderstand the traffic safety norms in a society,

they view the unsafe driving behaviors in the community as normal, which leads to greater risk-taking among these drivers (37, 38). Participants' beliefs about the prevalence of traffic violations in society make such behaviors normal, leading to more traffic offenses. However, in contrast, the results showed that some beliefs in society can mitigate traffic violations. For example, the study showed that religious beliefs and practices could help people to cope with job dissatisfaction and can partially mitigate unfavorable feelings of low-income, low social status, and job dissatisfaction, resulting in a better concentration on driving and safe behaviors.

"We had a colleague repeatedly said that we came from the morning and hadn't made any money. I said you should thank goodness you had a sound body; you could sit behind the wheel and bring home the bacon by the grace of God. He was ingratitudinal and edgy. finally, I heard that he had an accident while ago." (P7a43-JHS-TD-IDI)

Other issues raised during the interviews indicated cultural conflict. In this way, participants announced that people in the studied community saw their social culture separate from their driving culture. For example, they said that it was important to respect one another's rights in society while precisely the opposite behaviors occurred in their driving. So that the drivers didn't consider their driving behaviors as part of their social personality.

"My driving behavior is different from my social personality ... We find traffic and driving behaviors completely separate from our other social behaviors. I think pickpocketing is too disgusting... but that behavior is different in driving and I don't count, for example, if I change the line or even I double-park I am violating others right it's just like robbery, I am stealing their time and space..... but it's not disgusting in my eyes, which shows the separation of the traffic culture from our general culture of society." (P22a51-UG-PA-IDI)

4 – 2 Normalization Of Violations

It seems that the prevalence of driving violations in society had led to the manifestation of unsafe driving behaviors as a norm, which made it easier for drivers to commit violations. The proper context for learning the driving violations' techniques was created so that individuals received social support rather than social condemnation for driving violations. Driving violations were, now and then, considered as a sign of ingenuity, which caused people to get their destination sooner.

"For example, I don't say that it's flagrant to pass through the red lights, I don't give a fig about traffic regulations and citizenship rights! I'm smart ... I don't condemn disobeying traffic rules... Mr. Taxi driver weaved through the crowd and took us to the destination fast. He was a good driver who passed the no-passing zone but took us to the destination on time. Unfortunately, it's like that....no one blames this in our society." (P23a29-UPG-PA-IDI)

Additionally, the study showed that traffic chaos in the community also influenced the creation of sufficient conditions for unsafe driving behavior among drivers. Uncertainties in the traffic environment, traffic chaos arose mainly due to the factors such as driver-focused infrastructures, inadequate segregation of the motorized and non-motorized vehicles, lack of pedestrian segregation in traffic flow, improvident increasing in the number of vehicles in the country without expanding the appropriate infrastructure, and epidemics of violating the traffic laws caused traffic congestion and chaos in the urban traffic. Participants referred to the complex traffic environment with a combination of different road users. They said that sometimes a combination of motorcycles, bicycles, pedestrians, buses, and other cars could create a dangerous situation for them and made taxi driving a stressful job due to high occupational exposure to these traffic risks.

"... [Driving a taxi] is a dangerous job; we are all in danger. Motorcyclists cut in front of us, pedestrians run out in front of our car, youth weaving through traffic, and many others even hit and run." (P12a65-RW-TD-IDI)

Traffic chaos and non-compliance with safety regulations in the community and ambiguities in the traffic environment caused traffic congestion and road rage among road users, which may include some aggressive driving acts in taxi drivers. A vast range of behaviors were mentioned including conflicting with other drivers, attempting to retaliate against the aggressive behaviors of other drivers, not giving way to other drivers or battling to overtake others, making verbal abuse or rude gestures in the occurrence of near-misses, getting into a post-crash conflict, forcing other drivers into committing driving violations, and etc.

"For example, if I want to go from boulevard down to Honarestan [name of the alley], a taxi or a private car which is ahead of us [big vehicles] should give way and let us go, shouldn't they? However, they [taxis] never give way to anyone, never. Even if you beep the horn to them, they don't turn off the road, and if you toot for 2 or 3 times repeatedly he puts his head out of the window and starts swearing like a mad" (P30a42-UG-SSD-IDI)

In line with the results of the present study, studies referring to violence among taxi drivers in other contexts also showed the prevalence of verbal and physical aggression among these drivers(39). Some driving behaviors are caused by negative emotional motives, such as bad moods, anger or aggressive behaviors. The source of aggressive behaviors may be discomfort caused by other people. For example, if a driver does not move as soon as the traffic light turns green, the behind driver may perform aggressive driving behavior via beeping, or verbally abusing the driver, which may provoke the insulted driver to retaliate the displeased drivers' violent behavior. Studies have shown that public attitudes toward aggressive retaliatory behaviors are less negative than initiated aggressive behaviors(40).

5. Behaviors

Other frequently mentioned issues in the interviews were the unsafe behaviors of road users. These unsafe behaviors were common among all road users, including vulnerable road users such as bicyclists, pedestrians, passengers, motorcyclists, as well as bus drivers, private cars, and other taxi drivers. All of the participants mentioned the unsafe driving behaviours of taxi drivers and other road users. They identified several factors as the causes of these behaviors, such as lack of proper enforcement of driving rules in the community, lack of proper stewardship and governance, economic pressure, and socio-cultural factors. Risky driving behaviors were a multidimensional problem with a wide range of affecting factors.

A wide range of determinants may affect driving behaviors including driver's physical and mental abilities, psychological factors (e.g personality type, moods, and emotions), distraction by the external and internal stimulus, social context, individuals' income, socio-cultural background, level of law enforcement and governance as well as the internalization of compliance and respect for the law in society (40). Participants stated that the existence of unsafe driving behaviors has led to the spread of these kinds of behaviors, which in turn caused drivers and road users to emulate to be unsafe in driving.

1–5 Unsafe Behaviors Of Road Users

Participants pointed to the unsafe behaviors of many road users. As mentioned earlier, it seemed that acting unsafe driving behaviors were widespread among road users. For example, Participants, especially taxi drivers, referred to some of the unsafe behaviors of motorcyclists. They stated that sometimes motorcyclists might create a dangerous situation for them. Other studies also suggest that motorcyclists are high-risk road users; most of them are thrill-seekers. Driving behaviors such as waving through the cars, not paying attention to traffic signs and driving at high speeds are very common among these road users. Together with the high vulnerability, these behaviors make the motorcycle one of the most unsafe road users(41). Furthermore, participants pointed to instances of unsafe behaviors of other personal cars as well as unlawful passenger-carriers, which consist of disregarding traffic flow, parking in taxi stations, double parking, using mobile phones, cutting off the taxis in order to pick up the passengers, and so on. Which were consistent with the dangerous behaviours that were observed in other studies(42, 43).

"For example, A few minutes ago I fined a car which was parked in a taxi station." (P21a36-HS-PO-IDI)

Other issues repeatedly voiced by the participants, especially by taxi drivers, were the unsafe behaviors of intra-city bus drivers. They also revealed concerns about the unsafe behaviors of pedestrians and passengers. As well, taxi drivers pointed to passengers as the main reason for some of their unsafe driving behaviors. These results are confirmed by other Iranian studies. A study by Hashemiparast et al. (2017) showed a high prevalence of traffic violations among pedestrians. Their study found that non-compliance with traffic rules has become a norm in society and people has learnt to commit these violations from each other(44).

"Only pedestrians make traffic congestion at that intersection; It's not caused by cars. They [pedestrians] don't yield. They don't pay attention to traffic light and rights of other road users; they just cross the street anyway." (P7a43-GS-TD-IDI)

2.5 Unsafe Behaviors Of Taxi Drivers

Study participants referred to unsafe behaviors among taxi drivers. They described the most common ones including, but not limited to, double parking, not using the seat belt or pretending to fasten a belt, stopping in the middle-of-the-road (for picking up or dropping off the passengers), or at anywhere they want, not keeping a safe trailing distance, not using turn signals, running the red lights, not yielding to other vehicles, prolonged standing in a taxi station, speeding, using a mobile phone.

"I'm frankly saying that I don't fasten my belt and wherever I see a police officer in 100 or 200 meters ahead, I lay my hand and quickly drag the seatbelt, but I can't fasten it so much." (P3a35-ES-TD-IDI)

Driving behaviors are connecting the chain between the human and its consequences. High-risk driving behaviors can put the drivers and others at risk. In other words, some driving behavior patterns, including law violations such as speeding, following too closely, weaving through the crowd, poor lane discipline, not yielding right of way, taking unlawful turns can expose drivers to the risk of injury and death. These behaviors can be intentional, such as violations, or unintentional, such as errors and distractions (40). The most frequently stated unsafe behaviors in the present study were passenger scouting, making frequent and abrupt stopping in the middle of the street, picking/dropping passengers in wherever they wanted, reckless driving and speeding, illegal parking, illegal lane change. Referring to other studies, one can say these kinds of behaviors are ordinary for commercial drivers in the developing countries (42, 45).

Core Theme And Storyline

With all of the discussed themes, it seemed that the theme of stewardship and governance was a comprehensive one and somehow interfered with other themes. The comprehensiveness of this theme was also demonstrated in the focus group discussion; in a way that all interviewees repeatedly emphasized the importance and centrality of the theme. This theme consisted of two categories of strategic planning and management and the need for an integrated road safety organization. It is inferred that providing the implementation of these categories would, in some way, affect the other themes or categories raised in the study. Taxi drivers would be provided with financial support if strategic planning and management established in all organizations, including taxi drivers' organization, municipality, traffic department, and other relevant agencies.

By benefiting from financial support, the economic pressures on taxi drivers would be reduced, which would sequentially affect the unsafe behaviors of taxi drivers, such as competition for passengers, fatigue driving, and etc. On the other hand, reinforcing organizational strategies would make taxi drivers'

job rewards higher than their job costs, leading to increased job satisfaction and job commitment among taxi drivers. With the increase in job commitment, passengers' satisfaction would be also affected, which causes growth in taxi driver's income and their subsequent job satisfaction; increasing job satisfaction by itself affects the driver's behaviors. The second category of the core theme refers to the need for an integrated road safety organization. Clearly, by introducing such an organization, categories like law manifestation and economic pressure would be also affected, in a way that there would be short-term and long-term goals to improve traffic safety and law enforcement. Moreover, legislation regarding traffic safety would be taken into more consideration.

In this case, the effective actions of the organization and authorities would influence the shared beliefs of taxi drivers about the priority and safety in traffic-related organizations and would increase the level of safe behaviors in the community. Employees' behaviors could change significantly through changing management and leadership priorities. By putting organizations' priority on safety behaviors, the opportunity for the expression of socio-cultural values, especially the ones which advocate unsafe behaviors, would be reduced. A high priority of safety in traffic organizations and institutes, as well as establishing organizational strategies and goals focusing on traffic safety, would promote safe behaviors. Besides, it would weaken the effect of individual preference and the influence of cultural factors on behaviors. At the same time, low management commitment to safety would lead to placing a low priority on safety, leaving behaviors largely to the individuals themselves and their internal motivations. Furthermore, stewardship and governance could have an indirect impact on the safety culture in society through its impact on law-manifestation. Participants have repeatedly stated in the interviews that traffic safety legislation and its proper enforcement would lead to the institutionalization of safe driving behaviors and gradually cultivating it into peoples' daily routine in the society, thereby promoting safe driving behaviors in the community. As depicts in SEL-SB model (Fig. 1), the study results revealed that sociocultural profile was a mediator which could mediate the relationship between law manifestation and behavior as well as economic pressure and behaviours. In other words, the mentioned two factors, law manifestation, and economic pressure, played a moderator role which could affect the behaviours independently by themselves and also by moderating the socio-cultural profile.

Study Strengths

This study had strengths and weaknesses that should be taken into consideration when interpreting the results. One of the strengths of the study was the strategies used to enhance the quality of qualitative research; validation, reliability, and generalizability were used for this purpose. In order to increase the validity of the study, bracketing was used as well as triangulation of the data source so that the data were collected using two methods of in-depth individual interviews and focus group discussion. In order to increase reliability, the triangulation of researchers was employed, with multidisciplinary experts working together on coding, continuous comparison of data and codes, and data analysis. To achieve the generalizability, the researchers used theory triangulation so that the results were validated and supported by various theories, which in turn added to the generalizability of the study.

Study Limitations

One limitation of this study, which can be seen in other qualitative studies, was that the results were limited by study design and may not be generalizable to a larger group of taxi drivers. In order to minimize this limitation, the researchers attempted to recruit participants with a wide range of variety in age, work experience, and education.

Other limitations of this study included the fact that due to the long working hours of taxi drivers, as well as some of their tight schedules regarding services, etc., these participants could not be re-accessed to verify the resulting codes. In order to overcome this restriction, verification of codes and theoretical saturation carried out in a focus group of taxi drivers.

Conclusion

Overall, the results of this study showed the influence of five factors on the safety culture of taxi drivers, including stewardship and governance, law manifestation, socio-cultural profile, economic pressure, and behaviors.

The results showed that reducing traffic accidents relies on proper organizational planning. Participants emphasized factors such as the need for increased management commitment, cross-sectoral collaboration among organizations to improve traffic safety and quality of public transport services. Organizational commitment and strategic planning reduce the economic burden on a taxi driver and reduce pressure on him for money-making in any way (esp. by violating traffic laws), so increase his attention to safety, helping to make driving behavior more in line with traffic laws. The results indicated that socio-cultural factors (such as sensation seeking, the prevalence of unsafe traffic behaviors among road users, ...) somehow influenced behaviors. however, it was indicated that appropriate organizational strategies to reduce these traits, as well as stricter enforcement of traffic rules to prevent the impact of personal preferences on non-compliance, could limit the effects of socio-cultural factors on unsafe driving behaviors and gradually institutionalizes compliance with traffic laws as part of the culture of society. study results revealed that the socio-cultural profile was a mediator which can mediate the relationship between law manifestation and behavior as well as economic pressure and behaviours.

Abbreviations

GT

Grounded theory, GDP: gross domestic product, IDIs: Semi-structured in-depth Interviews, FGD: Focus group discussion, TMO: Taxi Management Organization, CPV ID: commercial passenger vehicle identity, EVT: expectancy violation theory, RCT: rational choice theory.

Declarations

Ethics approval and consent to participate

The ethics committee of the Zanzan University of Medical Sciences approved the study, and all participants completed the informed written consent before participating in the study.

Consent to publish

Not applicable.

Availability of data and materials

Data collected for this study were the transcription of the interviews and subsequent coding process, which were all in Persian. Therefore, the authors did not make it publicly available.

Competing interests

This study had no competing interests.

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Authors' contributions

MM carried out the interviews and transcribed them verbatim, analyzed, and conceptualized the data together with SA, and wrote the first manuscript. SA and MK contributed to the conception, planning, and designing of the present study, performed the analysis, and participated in writing and finalizing the manuscript. All authors have read and approved the final draft of the manuscript.

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Figures

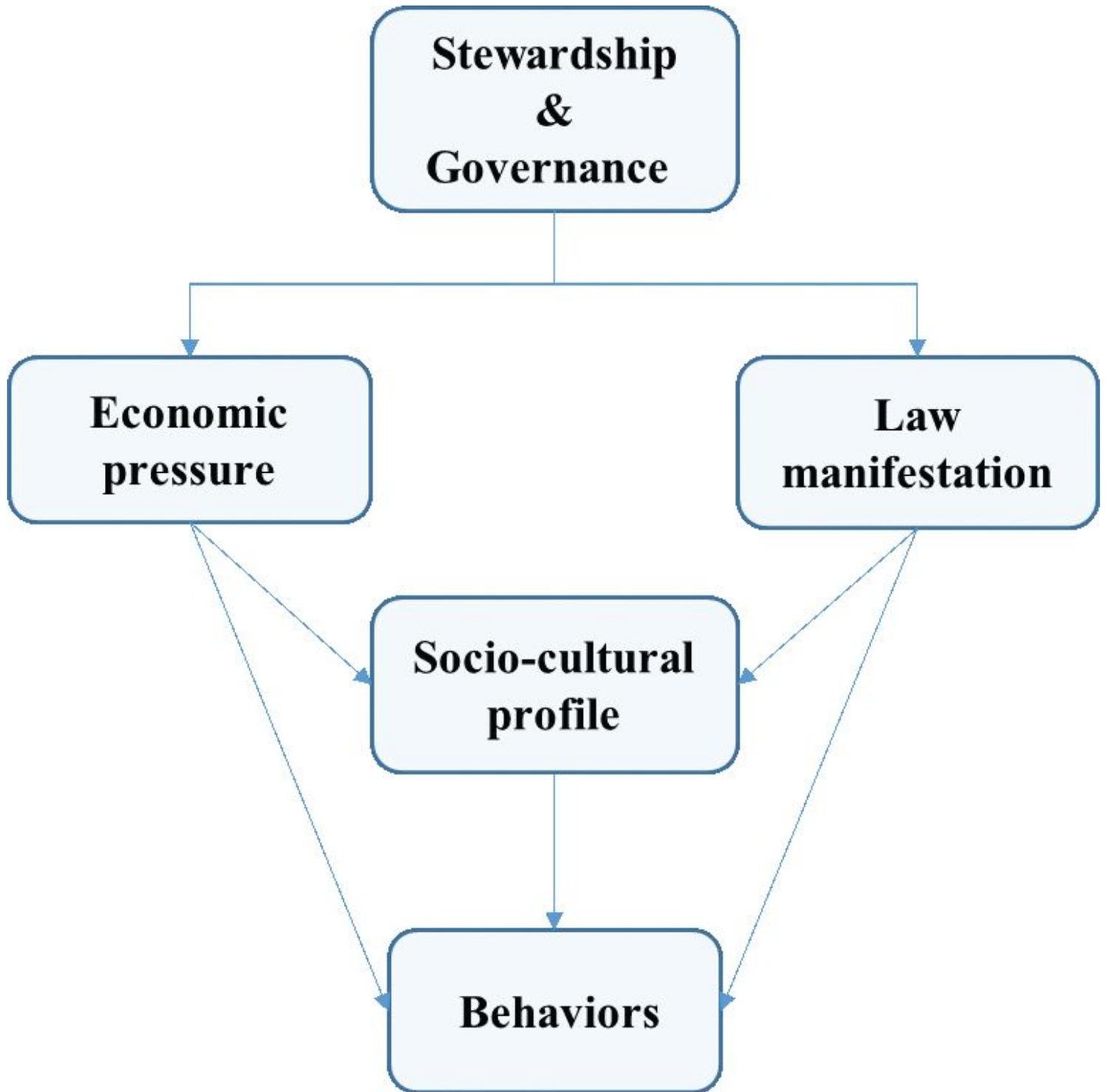


Figure 1

SEL-SB model of traffic safety culture for taxi drivers