

iLLUminate Blog Transcript: Saif Mir on the Effect of Nudging on Truckers

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- JACK CROFT: 00:14 Welcome. I'm Jack Croft, host of the iLLUminate podcast for Lehigh University's College of Business. Today is July 25th, 2023, and we're talking with Saif Mir about his research on how messaging can help nudge truck drivers to voluntarily reduce truck idling. Doctor Mir is an assistant professor in decision and technology analytics and teaches courses in supply chain operations management. His research interests are in the domain of behavioral supply chain management, examining factors contributing to sustainability and developing buyer supplier relationships. Welcome to the iLLUminate podcast, Saif.
- SAIF MIR: 00:58 Thank you so much, Jack. It is a pleasure to be talking to you today.
- CROFT: 01:02 Now, you've talked about how your research is in the context of nudging. I think most of us are familiar with nudging, whether as the nudger or the nudgees or both. But if you could talk a little bit about what you mean by nudging and how it translates into an academic research question.
- MIR: 01:21 Sure. So, when you think about a nudge and just pretty much a literal translation will be a push, right? So, when we talk about nudging in the academic context, it basically means or implies an initiative or a push to persuade an individual to change behavior, hopefully, in our particular preferred direction, right? So, an example would be, and one of the most famous studies was, pretty much just seeing the behavior of hotel guests and whether they would be nudged into recycling their bath towels-- well, not recycling-- or reusing their bath towels would be the correct term here, right, and not giving for washing every day. And that would be done simply by putting display cards in the washroom, which would inform them about either the percentage of hotel guests that reuse their bath sheets or also talking about the environmental impact, the water conservation initiatives that the hotel has going on. Other examples could mean something like littering in national parks and so on. Now, obviously, because I am in the supply chain area, and I research organizations and organization behavior, so when I think about nudges, I was interested in seeing whether nudges could be actually utilized to influence employee behavior, right? And that is how I translated it into a research question because when you think about it, a lot of the examples I gave you are in the public setting. These are not employees, right? So, will a nudge actually be effective in changing employee behavior? And there's also goes into the basis or maybe-- a just a little bit more elaboration on the nudge and a nudge is always non-mandated, right? So, it's not compulsory that you have to change behavior, and it should be non-incentivized. Otherwise, it's not really a nudge because you are just paying someone to change behavior. And by studying nudges in an organizational setting, my hope was to see if these small messages could actually be powerful enough for the organization or the management to use to change employee behavior. And I actually studied it in the trucking context.



CROFT: 03:45

Yeah, and I was wondering what was it that sparked your interest in the trucking industry and the issue of truck idling in particular?

MIR: 03:54

Yeah, that's a good question. And when I think about it, one of the things that comes to my mind is, first of all, if you think about trucking, it's also known as logistics, right? So, logistics is such an important part of the community. And I'll also say that even though it is right in front of us, it has been consistently undervalued. I think had it not been for COVID, people would not have realized the importance of supply chain, right? That's when all the supply chains started breaking down and people didn't have their goods. And so, when you think about trucking or logistics, you have to realize that it is really, really an important aspect for any nation. Just if you take U.S., for example, the American Transport Association statistics or reports show that in 2022, the trucking accounted for 72.6% of the nation's freight, right? And we have more than 3.5 million truck drivers that were employed in 2022. So obviously trucking is an important part of-- or trucking industry as such is such an important part critical for the nation's economy. And then when you think about truck idling, well, for one, what is truck idling? Truck idling is instances when the engine is on and the truck is not moving. So obviously it has a direct implication because on the fuel, right? And so they're obviously fuel cost associated with that. And then obviously there are environmental and social impacts associated with it too. And at the main-- if I can say, the main hero of this entire story is the truck driver. And in my previous experience, in my previous life, I was actually a merchant Mariner, so I have some, I wouldn't say sympathy, but I actually identify with the truck driver along because I used to be sailing on the high seas for long periods of time all by myself and my crew. So, I did identify with that aspect too. So, when I was a PhD student, I had come from the logistics background, so I knew the value of logistics and supply chain. And then when I came to the shore, obviously, translating the maritime experience, I thought it would be really nice to study the trucking industry and their issue of truck idling.

CROFT: 06:15

A lot of us probably haven't given a lot of thought to truck idling, other than seeing the trucks that truck stops across the country as we travel. But you point out in the study that you've done that it affects what's known as the triple bottom line, if you could talk about the harmful effects that have been linked to truck idling.

MIR: 06:39

So, I just talked with explaining or talking a little bit about what the triple bottom line is. And the triple bottom line is a concept which means that a successful organization fulfills three pillars of the triple bottom line, right? So, they are the environmental pillar, the social pillar, and the financial or the economic pillar. So, no organization in today's world can be successful-- so think of it like a Venn diagram where we have three circles, environments, society, and economy. And we would ideally want to be at the center where the three circles intersect, right? So, you want your operations to have minimal impact on the environment, minimal impact on the society, but have a positive impact on the organization's financial returns. And I think truck idling is a great example of that, right? So, I'll just give you some statistics from 2015, which estimated that 11 million tons of carbon dioxide are generated annually just from truck idling, right? And not just carbon dioxide, there are also other gases like nitrogen oxides [inaudible], and this is only in the U.S. So obviously, all these emissions impact climate change and the environment directly. And then if you also think about the harmful effects of these gases on the individual health, when it comes to respiratory problems and other ailments. So, there is a direct environmental and



social impact associated with truck idling, which we can reduce if we reduce idling. On the other hand, we are using fuel and fuel is money, right, there are direct fuel costs associated with park idling. So, by reducing idling, we can also save money for an organization. Now, I would like to add here, if you think about truck idling, truck idling is not something that drivers do just because they want to, right? It is directly related with the temperature in the truck cabin in, right? So, when they are stopped in the rest stops, if they do not idle, then they might not have air conditioning or they might not have the heat during the cold weathers or cooling during the high warm temperatures. So, it is a necessity. So, it would be wrong to say that idling should be stopped totally. But when it comes to idling, there can be nice, middle way where we would like to minimize idling and do it at a minimum and find some other ways to actually reduce the impact on the society and the environment.

CROFT: 09:20

That seems to be the thing probably complicating resolving this issue the most, which is that many, if not, most of the technologies that could reduce the harmful effects of truck idling are often quite expensive and, in the views of, I guess a lot of truck trucking companies, particularly prohibitively expensive at this point. Can you talk a little about that?

MIR: 09:50

Sure. So, they are actually quite a few alternatives, right? We have devices known as auxiliary power units, right, which are a different-- which provide you a different source for the climate control or temperature-- maintaining the temperature in the cabins, right? Again, like you mentioned, they are direct financial repercussions of this, right? So, companies are always concerned with the payback times and the duration associated with keeping the trucks in their fleet. They're also cooling technologies and heating technologies. And it's not only the cost, trucks are also concerned with how heavy these devices are, right? Are they easy to implement? What are the maintenance costs, right? What is the battery life? Do they have to keep changing it? So, all of these are genuine considerations. Another alternative could be electrified parking spaces. Like, again, this is not something that is available everywhere, where you can have an alternative parking space for the trucks which will allow the truck drivers to switch up their engines and plug it into the parking spaces for the amenities. So again, there are definitely a lot of technological-- not advances, but technological-- but ways in which technology can actually reduce the effects of idling. But again, they are either expensive when you consider their implementation costs or the maintenance cost. So that is definitely why the situation is complicated, right? If it was cheap and it was something that would be easy to do, then I'm sure every company would be doing that. In fact, the U.S. Department of Energy is really concerned about this. So, they do study a lot of different ways. It could be autonomous vehicles, where you do not have a truck driver. So, the need to idling is reduced, right? Then there are also alternative fuels which are being studied, biodiesel, the use of electricity, hydrogen, natural gases, and so on. So, all of these are different ways in which companies are thinking of reducing the impact of truck idling.

CROFT: 12:01

And of course, the option of vehicles that drive themselves without a truck driver raises a whole other set of issues, particularly for the truck drivers. As you said, there were 3.5 million, I think it was truck drivers in the U.S..

MIR: 12:21

In 2022, yeah.

- CROFT: 12:22 Yeah, the impact of that would be huge as well, so. That just kind of outlines the difficulty in this, finding something that works.
- MIR: 12:32 Absolutely. Yes. That is absolutely true.
- CROFT: 12:37 And also, the need to find something that can make a difference, which gets us kind of the crux of your study, which was looking at how different messaging approaches that trucking companies use with their drivers may help them voluntarily reduce truck idling. So, if you could start by explaining what social norms and personal norms are within the context of nudging, and how the two differ and how they play into this messaging.
- MIR: 13:12 Definitely. So, when you think about nudging, nudging can be implemented in many ways. And the way that we were actually going about it in our study was by using messages and specifically using messages which were framed or scripted using normative behavior. And when I say normative behavior, I mean social norms and personal norms. Now, I'll just elaborate a little bit about what social norms are and then I'll talk about personal norms. So when you think about social norms, social norms are general beliefs about how somebody should behave in a group or society. And if you think about it, people are concerned about how they are perceived in a society, right? We are always worried about how others perceive us. So when it is known to us, what others are thinking about us or what others think about a particular behavior, it is likely that we'll change ourselves to adapt to the behavior. Now, social norms, again, out of two types, the first is descriptive, which is basically referring to what is our behavior that is observed. And an example would be just by giving a statistic, right? So, by saying 80% of the drivers reduce truck idling. Or if I go back to the example of recycling towels at a hotel, 90% of the guests at this hotel prefer to reuse the towel. So, it's descriptive because it gives you a definite number of the number of people in the society who think in a particular way. The other type of social norm is injunctive, which talks about behaviors that ought to be done, or behaviors that are approved or looked upon highly in the society. And this can be implemented just by telling them we think that reducing idling is a good way to save the environment, we think, reducing idling is a good way to help the organization. So it shows approval for a particular behavior. So, these kind of messages actually use the beliefs about a person and make it salient to the individual, right? In my case, make the idling behavior, salient to the truck driver, and hope that they will reduce idling. The other kind of norm is personal norm, which if you think about it, every person has their own value system within themselves, their own beliefs, what they think is right or wrong. And by showing them a message, we might evoke on their personal values and try to reduce idling, right? So, these messages will just talk about how if you minimize idling, you show that you care about the environment, right? So that's the example. By minimizing idling, you show that you care about the environment. By minimizing idling, you show that you care about cutting fuel costs. So these are two ways in which a message can be scripted to evoke the personal norms, right? So, when you think about social norms, classified into two descriptive and injunctive, and then we have personal norms, which are by itself. That was how we actually went about our study.
- CROFT: 16:27 What were the hypotheses, the kind of ideas you had in mind, when you set out to do the study and what was the methodology that you used to set up the experiment?



MIR: 16:43

Just going back into the theory that I was talking about. So social norms out of two types, right? So, we have the injunctive and the descriptive. And so the descriptive norm is simply informing a truck driver about the percentage of truck drivers in a fleet, who average less than idle. So that was one hypothesis. The descriptive norm idling or hypothesis by itself. And then we have the injunctive hypothesis. Now the injunctive hypothesis shows approval for a behavior. Now, you can show approval for the behavior to help the environment or show approval to reduce idling to cut through a cost. So, the injunctive messages were of two types injunctive environment and injunctive organization. And then we have the personal norms, which again can evoke individual beliefs to help the environment or help the organization. So in total, we had 5 different kind of messages that were sent out. So descriptive injunctive environment injunctive organizational personal environment and personal organization. And we were trying to see if these messages actually were successful in nudging to and drivers to reduce idling voluntarily. Now, voluntarily is the critical word here.

CROFT: 18:03

Right.

MIR: 18:04

And to actually study it, we use the field experiment, right? So we worked with a public company who had a more than 1,200 trucks. And they agreed to work with us. And so we allotted around 600 trucks into 6 treatments. We kept hundreds of them as a control group. So this was a group where no messages were sent out. And we compared the idling behavior of the 5 treatment groups with the control group to see if over the [inaudible] duration when the messages were sent out, the drivers which actually reduce idling. We had total 26 weeks of data, right? So we had 13 pre-intervention weeks and the 13 weeks of intervention for around 600 trucks broken up into 6 groups. And so, what we did in the studies, every Thursday, I would go to the fleet manager's office, and I'll have to say I'm really grateful for the company that they allowed us to study this phenomenon. And we would send out a message to the truck drivers and we did that every Thursday for 13 weeks. And then we would get the weekly idling summary of each truck that we used to actually study, whether this was successful or not.

CROFT: 19:25

The main question, what were your findings? Which of the messaging that you were testing proved effective and were there any that did not?

MIR: 19:37

Surprisingly. Well, let's start with the sad part. If you think about it overall, overall, we found that in the 13-week duration, if you think about it, it would seem like there was no effect of idling-- or no effect of nudging to reduce idling. But then when we went into the data, what we found that there was actually an effect, we found that initially in the first four weeks, truck drivers in the injunctive environment and in the descriptive groups, they reduced idling, right? So, they reduced idling compared to the control group, but then gradually they reverted back to their old behavior as they received the same message over and over again. And this effect was found for the injunctive environment for both kinds of trucks. We had trucks which were fitted with APUs and also trucks which did not have APUs. So, we found the effect for injunctive environment messaging for both the trucks. The descriptive message, we found that it was significant to reduce idling in the initial duration for the non-APU tracks. So overall, if I think about it, then what our study showed that messages can be effective, but the efficacy of messages is reduced when the same individual receives the message over and over again. And I think this is important when you think about



it in an organizational context, right? Because messages have been effective where it's in the public setting. For example, organ donation, I can only donate my organ once. It's not like I have to keep-- I will keep on seeing the message and I have to decide every day. But for an employee who is working for an organization that is a lethargy or what we term as a fading effect that we see, right? So, the effect of the message slowly fades away-- or the message of the nudge slowly fades away. And we found that after a particular point, there was no particular benefit to send the same message. And so, it does have some interesting implications if you think about it, right? When you think about the trucking industry, first of all, it is equally important to know what should not be done, right? So, you should not keep sending the same message over and over again. After the first few times, that efficiency is lost. And this is important to think when you think about how difficult or how different interventions are framed and it is a time consuming effort. So, organizations have to leverage messaging for short duration projects. And again, it is only the social norms and descriptive norms that we found to be effective for the truck drivers. It wasn't the personal norms. So, this, again, I thought was pretty important to understand. Even between the two social norms, injunctive environment norm was more effective. And then finally, when I think about it, I think messages can also be effective in industries where we have temporary workers, right? So, it's not the same worker who sees the message. So, if you think about industries like agriculture or warehousing that you have different workers who come across the messages, then it is likely that nudging can be effective.

CROFT: 23:05

Okay. Now, in terms of and you talked about this upfront, the companies obviously are looking for a way to reduce fuel costs as well as the other harmful effects by reducing idling. And did your study find any cost savings as a result from the messaging?

MIR: 23:27

Yeah. So, there are many savings. There are many studies which talk about the fuel saved, right, the fuel saved by reducing idling. Now, we took a conservative-- so in the study, we found that the idling reduction could be as much as 2 to 3%, but we took a conservative number of one and a half percent just for calculations. And even if we show that this reduction is linked with saving .9 gallons of fuel every week, for a fleet of 1,200 trucks, that is equivalent to savings of \$15,000, right, which is amounting, which is coming from the [inaudible] 43,000 gallons of fuel. And this is also directly linked to around 4.2 metric tons of carbon dioxide emissions. So there are definitely fuel savings and also environmental benefits associated with just nudging drivers. Maybe just over the summer time when they are more likely to increase idling because of the temperatures.

CROFT: 24:36

What are some of the potential solutions? And we talked about this upfront, but in light of looking at the impact that messaging can have, what are some of the potential solutions that could reduce or someday, hopefully eliminate our reliance on trucks burning fuel while idling just to basically keep their driver safe?

MIR: 25:03

Again, I think this is a tricky question. I would like to add that idling is related with driver comfort. Right? So, it would be wrong to say that truck drivers should not idling, right? Everybody is a human, everybody has a right to live. Truck drivers are very, very important part of the nation's economy. And so, I think it's just an operational necessity if I can put in that way. And so, when you think about it, I think it has to be alternative fuel sources, right? So, when you think about alternatives to



resources, making APUs or auxiliary power units mandatory, which can actually help in reducing idling. But at the same time, maintain comfortable levels for the truck drivers. I did talk about autonomous vehicles initially, but again, that's a whole different topic, which will require a different podcast about the implications of autonomous vehicles and how it can result in job losses around America. But then also, we have to realize that there's a truck driver shortage going on. So there are many different dynamics at play. And the situation is much more critical than we think.

CROFT: 26:21

Now at what point do the social environmental and economic impacts, what was referred to as the triple bottom line, outweigh the additional costs of the trucking industry to install some of these alternative methods of heating and cooling trucks and what might drive that to actually happen?

MIR: 26:46

Well, honestly, I would think that the social and environmental pillars are sometimes at loggerheads with the environmental pillars, right? So, I think there has to be a big public policy initiative and governments have to realize that without their support for the transportation industry, it is really difficult, because if you think about it, the transportation industry also has to survive. So, they do need to make money. And so it would be wrong to say that, hey, move goods from point A to point B-- point A to point B, but then you should not have a negative impact on the environment or society. We will not help you. So, I think there has to be a time when-- and governments, at least the U.S. government is taking a lot of steps for that, right? So, they have different departments which looks at, for example, alternative fuel sources. And they have studies which are going on, which talk about the benefits of that. They have studies which talk about sustainable transportation, and there are different research. There is a bioenergy office, hydrogen and [inaudible] office, there's a vehicle technology office, right? So, all of them are thinking of ways to have clean energy in America, right? So, they are pretty much advancing sustainable transportation if I can talk about that, right? So, the whole idea being that it will obviously reduce cost for fuels and vehicles, and then also reduce carbon emissions. So that has to be a main goal. And I think it has to be a public policy initiative in many ways. And again, I would say if you think about climate change, it is a genuine concern, right? Think about the unusual heat waves that a lot of countries have been facing in the last few years. So I think with time, definitely, it will become mandatory. And hopefully, by then, the technology will also have advanced that maybe hopefully we won't have to think about it. And we'll have overcome that. But it's almost always the social and environmental benefits at loggerheads with the environmental impact that creates this tension.

CROFT: 28:59

Now, we've talked about a lot of the factors related to your research, is there anything we haven't discussed that you think our listeners should know?

MIR: 29:09

Well, I've been the one thing, and I think I did mention it also, so my research falls into the category of behavioral research where we think about how individuals respond, right? And so, I think it is important to understand the human element in any operation. And as you think about how the world is changing, that has to be something that will drive how operations impact societies and the triple bottom line. So earlier, we would be concerned with how organizations impact societies. And that is definitely still true, but at the cusp of the story is that it is actually people or individuals who run the organizations and they could be the operational managers,



the transportation people, the warehousing people, and so it is going to be really, really important to understand how every small piece of the supply chain links and actually impacts the triple bottom line.

CROFT: 30:19

Okay, I think we have enough time left to talk about one more thing, which you had mention in passing toward the beginning of the discussion. And that was your previous employment history working on oil tankers. And I'm wondering about what your experiences on the high seas were like and what you learned about life from them, but also I'd be particularly interested to hear whether those experiences helped shape your perspectives in your academic research now.

MIR: 30:54

Yeah, it seems like a lifetime ago. But yeah, so I worked for nearly ten years. I started off as a cadet and I worked my way up towards a second officer. I had my chief mates license, which is one level below the captain, when I decided to switch gears and go for my MBA, and then I landed up in an academic position here. So, I think there are many different things that I learned, right, while on boat. And I think if I think of it from an organizational perspective, I realized the importance of individuals and actually the workers and how important they are, even though so many times, they are away from the organization. So, if you think about it, we were like a crew of 26, 27 people who were sailing around the world for 6 months at a time. And obviously, the crew changes, we form new relationships, and so it is really, really important for companies to encourage and motivate and be there for their employees. It is really important. I think that is something-- I'm talking a little bit of the management principles here, but I understand. And that was also maybe one of the reasons I quit because I thought that the companies did not care about us at that point. And I was just tired about the difference because-- I wouldn't say difference in opinion, but how I felt that I was not being valued as employee in my personal experiences. But it was also the personal need, I would say, right, to just make sure that I could go out and be there for my friends and family. And I think that did bring about an appreciation of all the people who work in logistics. So, if you think about all the people who are marinas, who are truck drivers who are railroad drivers, who stay away from their families, who are giving away family time, who are working on holidays and weekends trying to transport goods so that the end consumer receives that. That is definitely an underappreciation for these people, right?

MIR: 33:17

And it is really important. Like I worked on tankers, we would take oil from an oil producing nation to another nation, which did not have any sort of oil. So obviously, it brings about this appreciation for supply chain and logistics. But at the other time-- on the other hand, it also shows that that is there is a need to understand the importance of the manager or the person who's actually behind the logistics system, right, who is actually working it. And I feel that I felt undervalued at the time. And I think slowly that is changing now. And it could be something as a simple as the truck driver who is delivering the goods to you, right? The Amazon truck driver who is coming and giving you the goods, you have to realize that it is really not an easy job driving around the city, delivering goods, working on Sundays, working in the snow, working in the ice. We are angry because we don't receive a package. We take out the frustrations, we blame the truck divers and the logistics people, but there are many things that happen, there is whether. So just to give an example, on the oil tankers in the time that I did decide to quit, piracy was up very, very rampant in Somalia, right? So ships were being chased by pirates. I have had myself experience being chased by



pirates. Luckily, nobody succeeded, right, but there are actually hazards that this logistics people actually face that many people do not think about, right? So there is definitely-- and I would say that it did influence my research also. If you think about it all my research is behavioral, so I like to study ways to influence behavior. I've heard about, luckily I haven't seen, but people dying on boat ships, right, while on the job, and it was just because the operations were not done well. In this particular case, somebody went down a tank and they succumbed to carbon monoxide or some gas that was being emitted from the fuel. At the end, the logistics personnel is also a human being, and they have-- and not just companies, but even the consumers, everybody has to realize that there's actually a human element attached to every operation, and that operation is actually impacting their daily life. So there has to be a way to actually appreciate and acknowledge the importance of that. And that's what I would like-- that's what I am studying in my research.

CROFT: 36:02

Well, I think we're out of time. Saif, it's been most interesting, and I must say, I believe this is the first time I've interviewed a faculty member, a doctorate who has been chased by pirates. So, thank you for bringing your perspectives onto the ilLUMinate podcast today.

MIR: 36:21

I appreciate you taking out time for me, Jack. It was a pleasure talking to you. Thank you.

CROFT: 36:26

I'd like to once again thanks, Saif Mir for being with us on ilLUMinate today. His research has been published in the International Journal of Physical Distribution and Logistics management, the Journal of Supply Chain Management and other leading journals. And as an example of how Lehigh College of Business faculty and students are creating new knowledge in the field of data and technology analytics. This podcast is brought to you by ilLUMinate the Lehigh business blog. To hear more podcasts featuring Lehigh business thought leaders, please visit us at business.Lehigh.edu/news. And don't forget to follow us on Twitter at LehighBusiness. I'm Jack Croft host of the ilLUMinate podcast. Thanks for listening.