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Paper title: CB–radio in road traffic as social network and information technology

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Abstract:

Aim of this paper is to introduce CB radio, its possibilities when using as source of traffic information, and author's empiric experience with long term practical using of it. And to describe a gross draft of plan of research, whose aim will be to check and evidence if CB radio is better than other channels for distributing and gaining of traffic information.

Results of the future research can be useful for next development in traffic information technologies.

Key words:

Traffic information; Social network as information technology; CB–radio; CB radio; Citizen band; Radio; Transceivers; Road traffic.

I consider both terms “CB–radio” as well as “CB radio” to be acceptable. I have used both ones in my text; it does not have any difference for meaning. It does not matter for me if will be kept both forms or will be chosen one of forms only.

But I think it would be good to keep both ones in keywords, because both forms are being used as usual.

(Use semicolons for distinguishing key words, comma is reserved for

distinguishing parts of a multiple clause.)

Bibliographical note(s) of author(s):

PhD student who used to work as van driver (inter alia) during his master's study.

User of CB-radio on Czech & Slovak standard since ca. 2nd third of 90's of 20th century and user of CB-radio on Polish standard since February 2010. Having two transceivers on a dashboard and three long antennas (one for receiving of common radio broadcasting) on a roof of his car to have as good traffic information as possible.

(You can write here whatever you want about yourself, your professional activities etc. Recommended size is approx. 150 words for only one author or 100 words for each author of a team.)

Body of a paper:

An Introduction – Entering information about CB radio

Various information technologies are being used as source of traffic information for drivers. Aside well-known technologies, like radio broadcasting with RDS or GPS navigation systems with RDS-TMC, it is CB radio system of transceivers too.

This paper is based on author's empirical long-term (ca. 15-17 years, more than one half of his life) personal experience with using of CB-radio, mainly in road traffic.

CB radio (CB = citizen band, civil band) is standard of transceivers, whose using is allowed generally for public. Standards are not the same in all countries, but in each country exists channel (frequency), which is reserved for communication between drivers and for sharing of traffic information. CB uses radio band around 27 MHz (wave length around 11 metres).

Drivers of lot of trucks, some vans, few off-road expedition cars, and just rarely of common passenger cars use CB in Czech republic. So, CB radio is absolutely unknown technology for the most of Czech people. Approximately same situation as in Czech republic is in Slovakia.

Whereas CB is installed in lot of cars, including passenger ones in Poland. So CB-radio is well-known there. Three reasons for this big difference between two neighbour Slavic countries:

- Polish police is sharper and has bigger respect from its local citizens than Czech one
- Polish people have wilder character, Polish drivers are faster and more risking
- Polish AM CB transceivers are ca. 2to3 times cheaper than Czech FM ones

Comparison of Czech and Polish environment is based on author's knowledge of Poland sequent to whole-life living on state border with Poland, on studying of Polish language and culture, on travelling through Poland (not only), and on this year's one semester study staying in Poland.

Truck drivers in lot of countries, including non-European, use CB radio - but author of this paper has personal experience with Czech & Slovak and with Polish CB radio only.

Brief history of using of CB radio in Czech republic

Way of using of CB radio has been changed during the time progress.

It was available since beginning of 90's of 20th century in Czechoslovakia, when GSM phones were not available, price of NMT phone corresponded to ca. 6 month salaries (charges were high too), and waiting period for fixed phone line could be e.g. 3 years, even if with shared line.

So CB radio was being used as communication technology for families, companies, organisations, or friends. Emergency channel used to be monitored by EMS, police, or metro police in lot of Czech towns in this time. It was really possible to call EMS to traffic accident by CB (verified).

Whereas today, in beginning of 21st century, it is possible to get function cell phone free of pay; charges are quite low, modern transceivers on new standard PMR (Personal Mobile Radio; band around 446 MHz; lower price, size, weight, battery consumption, and range) are available for sport, outdoor activities and events organising. And lot of internet services exists for unimportant social gratis conversation (chatting) between people.

So *CB radio is being used already almost by drivers only today*. Although it is quite old technology, it still has its place on dashboards of a trucks, aside the most modern GPS navigation systems equipped by RDS-TMC input and aside broadcast radio receivers with RDS. Reason of persisting popularity of CB between truck drivers is relevance of traffic information...

Technical principles and law conditions

CB radio is being used without repeaters on traffic channels. It means direct transmitting from transceiver to receiver, and limited range. Between two cars, it can be 100 m in direct visibility - with broken antenna during high radio traffic; as well as it can be 40 km passing a hill - when good antenna and uncertified amplifier (making power e.g. 100 W instead of allowed 4 W) is used.

Transmission range depends mostly on position and equipment of transmitting side. So, com. paths (relations) can be directed (oriented) in network of mass CB communication.

Network member has connection with two another members, who are not connected mutually. Each state of network and paths is very temporary, it is valid in concrete time moment only, because summation of speeds of two cars in opposite direction can be ca. 3 km per minute, so conditions are changing quite fast during conversation when cars are going near or departing.

CB transceivers are half duplex. It means that each TransCeiver can be transmitting, xor receiving in each moment. Maximally one station can be transmitting on one channel in one geographic location (range of transmitting station). All other stations on the same channel in the range can be listening. When two or more stations are transmitting too near on the same channel, signals jam each other and someone cannot hear anything and someone hears just the stronger (nearer) station. Group communication ("conference", by phones vocabulary) is big advantage of radios and it is basic precondition for using of radios as social network and information technology. It is not necessary to establish connection between two or more concrete users. When channel is empty, anyone can start transmitting; and everyone, who is in the range, hears him immediately. "Conference" is "established" immediately without any complicated procedure (dialling, ringing or technical joining), so everyone can add his piece of information or opinion almost immediately. It is strength of CB in role of social network and IT.

National standards are various; some stations can just jam each other, not to communicate.

Empiric experience with CB in road traffic

Social network

CB radio, regardless if in point of view as traffic information technology, or if in point of view as system for group communication, is network of *people* equipped by transceivers.

Usability of CB radio system depends on people. It is possible to see especially in Czech and Slovak republic, where it is being used almost in trucks and few vans only - it is not function during weekends, when truck driving is prohibited, and on small roads, where truck traffic is not present. This can be better in Poland, where lot of passenger cars is equipped by CB (but some level of road traffic is still necessary to cause enough volume of radio traffic).

New term “*social network*” is being used quite often in ICT world for few last years. Although this term is much newer than CB-radio, it is possible to class soft system of CB radio and its users as social network (network based and depending on users, on *people*).

And CB has the same problems as other social networks when being used as information technology - human element can bring noise (by unrelated disturbing nonsense communication), false information (by mistake, by misunderstanding), or quite impolite expressions sometimes too.

Information technology

While common radio broadcasting distribute information about traffic in whole country or region, CB radio has limited range (from hundreds of meters to several kilometres). So users are not being disturbed by non-interesting “information” and can notify real useful information, related to area or road where they are just now.

Each piece of traffic information has to wait for its dedicated time in broadcast time schedule. So traffic information has big delay in broadcasting. Additionally, lot of radio stations exists.

Whereas each piece of information is distributed immediately at CB band - when some driver sees radar or accident or another danger, he tells it to an other drivers, so delay of transfer of information is few seconds only at CB band, instead of tens of minutes at radio broadcasting.

So CB radio is instant and local in comparison with radio broadcasting. So it provides much more relevant information.

Additionally, it is possible to ask other drivers for some concrete information, demanded just now (traffic situation in front of driver, navigation to concrete destination company, navigation to petrol station or toll sale, other local problems).

Each piece of information is turning around in circle in some limited (thus related) area around place of occurrence of event. It is being constantly repeated and continuously actualised during whole period of event validity by new drivers who are coming to that place from all directions. Because of various range of transmitting and various positions of drivers, piece of information is forwarded by some driver on demand of other driver, who has heart that first driver is thanking for receiving of piece of information.

Everything aforesaid ensues from long-term personal empiric experience. Author of this paper has clear opinion about usefulness of CB radio in a car (that is why does he use it - as well as the most of truck drivers), but it is necessary to evidence hypothesis by hard numbers.

A research about this topic already exists. Research was done by asking in 1200 transport companies in California, USA by Regan and Golob (1999). It shows the same experience - *CB-radio is the best way of gaining of traffic information for drivers* (sharing first position with freeway changeable message signs).

The strength of social network generally (not depending on used communication technology) as source of traffic information is confirmed too by the same paper from Regan and Golob (1999) - *the best source of traffic information for dispatchers are reports from their drivers on the road*.

Gross concept of plan of research

Aim of this research will be to explore, verify and evidence possibilities and benefits of CB radio as a source of traffic information.

First pre-research has been already done as part of preparation of this paper in last months. It was without big statistic sample. Main aim of this pre-research was to try punctual logging of traffic information into the protocol - to verify or change scheme of the form.

Main research

Topic of main research will be to watch float of traffic information on various information channels (sources) simultaneously with aim to verify speed, quality and geographic relevance of distributing of traffic information by this information channels:

- CB radio (Czech and Slovak traffic channel; Original idea to monitor more national channels was rejected because of too low foreign radio traffic)
- Public radio broadcasting (one full-area and one regional station; no info about radars)
- Commercial radio broadcasting (ca. two full-area stations and ca. three regional stations)
- NDIC website (official National traffic information centre, source for public radio broadcasting)
- SMS system radary.cz

Monitoring can be being done:

- In interesting places (traffic knot; main road during some traffic event)
- With monitoring of frequency of repeating of the same information
- In various weekdays, in various time, on roads of various size (importance)

Another researches

- Central information service operated in traffic knot (logging of information float into a protocol)
- Watching how much of drivers paying penalty for over-speed have CB antenna
- Watching of distance-light signals and gesticulation of oncoming drivers
- Counting of vehicles equipped and unequipped by CB antenna, with information about country and category of vehicle; verifying how much of drivers with CB antenna really uses CB
- Everything for various types (sizes) of roads, various weekdays, various time

- Watching of traffic information and comparing with real state during driving

Research should show and evidence if CB radio is really as useful as does it seem empirically after ca. 15 years of occasional using.

Conclusion

CB radio provides much more *related information* (in aspect of location and time) than radio broadcasting, because it is instant (few seconds) and local (several kilometres). Whereas radio broadcasting has unacceptable time delay (tens of minutes) and place irrelevance (hundreds of kilometres). And information integrity (non-absence of information) is better on CB too. But usability of CB radio depends very grave on type of road and on weekday + time, because it depends on truck traffic.

It is necessary to verify empirically made conclusion by some statistic-acceptable way. Foreign drivers usually respect prohibition of using of their radios, so it is not possible to monitor information float on various national CB traffic channels. But it is possible to compare information float on Czech CB traffic channel with other sources of traffic information.

Scientifically acceptable results could be inspiration for developers of sophisticated navigation and traffic information systems. It could be evidence that people (users) are still quite important part of the world and new traffic information systems could be duplex and could involve an users as direct and fast source of information.

Notes for editors (901 or 902).

Notes for tpesters (903 or 904).

Notes for proofreaders (905 or 906).

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(Frequently used words in the titles of the journals will be abbreviated.)

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Acknowledgement: