MARKETING INNOVATIONS IN THE AUTOMOTIVE INDUSTRY GLOBALLY

ИНОВАЦИИ В МАРКЕТИНГА НА АВТОМОБИЛНАТА ИНДУСТРИЯ ПО СВЕТА

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Abstract: *In the center of the development of the new cars marketing tendencies in the next decades lay the innovations in few industries which interact between. This leads to the appearance of the autonomous vehicles, connected vehicles – between themselves, with the infrastructure and with the other personal smart belonging, incl. home; the strategic approach towards smart vehicles, shared vehicles, electric vehicles and finding ways this technology to become mainstream. These are now priority for the largest car manufacturers. The technology, Internet of Things, the environment and the change in the consumer behavior will create new types of products – smarter, more intelligent, more connected and integrated into connected ecosystems between the industries and businesses.*

Keywords: MARKETING, AUTOMOTIVE INDUSTRY, AUTONOMOUS VEHICLES, ELECTRIC VEHICLES, FUTURE MOBILITY, MARKETING TRENDS, INNOVATIONS

Introduction

The desire for travel has its consequences: the cities become noisy, congested and poluted. (*Bouton S, Knupfer S, Mihov I, Swartz S, 2016, McKinsey***).** People spend hours in the trafic and the air polution is inevitable. The mobility becomes critical for the economy, because of the movement of goods and services. Everybody is moving around with some purpose – to scool, to the office, going see friends and family. However moving form A to B is safe, ecological, affordable and reliable on very few places.

It is expected that the way people travel in the cities will change dramatically. (*Neuman C-S, 2015, McKinsey*). New business models, such as Uber, already change the traditional ways of travel. The technological innovations such as electrification, connectivity, Internet of things (IoT) and autonomy are already in place. The increased urbanization of the megacities (*Dobs R, 2010*) with more than 10 million citizens, offers opportunities for change.

The mobility systems will differ than current ones. In the center of this evolution is going to be the individual traveller, and the consumers should be opened to new technologies and services. The public and the private sector are the ones to pave this way. Of course the innovation and the communication strategy should be always sinchronzed. (*Chernatony, 2003)*

Innovation trends

In the next 10-15 years, lots of trends – from decentralizing the energy sector up to the IoT, are going to connect and will create drastic changes in the mobility systems. There are two main factors for going this direction. (*Hannon E., McKerracher C., Orlandi I., Ramkumar S, 2016, McKinsey*). **First**, some key tendencies in the mobility – electrification, shared driving and the autonomous vehicles, are about to happen. The prices of the lithium-ion batteries will drop in the next decade. The shared driving and hailing services are happening on some big cities around the globe, due to the smartphones evolution and solid financial resources. Almost all big automotive and technological companies form partnerships or alliances, in order to provide human-less mobility. **The second** factor is that the tendencies in connected areas are boosting one another. The urbanization is expected to increase the average population density in the cities with 30 % by 2030. The sustainability will become more important for the individuals and the managers of the companies. The increase connectivity begins to reveal lots of opportunities for the shared mobility, as well as the autonomous driving, safety on the road and the potential services which to be offered inside the vehicles.

The combined impact of both factors will be significant. The more shared mobility will impact the sales of electric vehicles, because of the more intense usage of these shared vehicles, improving the economies of ownership. The bigger manufacturing of electric vehicles will decrease the cost of the batteries development. It will provide usage in the close areas such as distributed storage. The decrease cost of the the electricity could improve impact of the greenghouse effect by the electric vehicles as they will have more charge by low-carbon resources. There is powerful dynamics based on the strong interaction.

Today not many cities have effective mobility infrastructure – developed and working public transport, ecological ways to move around and stimulating them, or to have maneged to limit congestion and polution. It is recommended to combine shared mobility, autonomous cars and transport electrification with integrated energy systems, public transport and the infrastructure. It is expected that the future will be radically different, based on three models of advanced urban mobility, which to be achived by 2030 (*Hannon E., McKerracher C., Orlandi I., Ramkumar S., 2016, McKinsey***).** Each will be appropriate for the specific type of metropolis depending whether it has dense, it is developing, or it is spread with suburbia. The cities will be able to demonstrate the effects of the mobility innovation on everything – from electrical systems up to the usage of public spaces, thus creating new dynamics. (*Bouton S, Knupfer S, Swartz S., 2016, McKinsey***)**.

The new ways of transportation will cause changes in other sectors which will have to find new solutions and opportunities. The electric vehicles could represent 3% of power demand worldwide, and almost 4% in Europe by 2030. Various electricity supply plans could leverage the negative effects coming from the charging of the cars. The electric vehicles could support the increased usage of alternative energy resources for charging. (*Hannon E., McKerracher C., Orlandi I., Ramkumar S, 2016, McKinsey).*

The automotive industry is about to change fundamentally in the future, and the car ownership models should be reconsidered in the direction of range of transportation services provision. The electric vehicles are direct competitor of the conventional ones. The gas stations networsk should consider various ways to benefit from the new future technologies and to be able to provide to give value and new experiences to their customers, i.e. charging infrastructure, shopping centers, shared ride stations etc. There are huge opportunities for the technological companies as well, because with the growth of the smart vehicles and the connectivity, there will be bigger demand for software and sensors.

The new innovative technologies change the ways the companies develop and manufacture the vehicles too. Electric powertrains and fuel-cell powetrains offer better performance, with less investment at lower emission levels. (*Consumer reports, 2014*). The new lighter materials allow for the manufacturers to lower the weights of the cars without sacrificing the safety and to provide better fuel economy and lower emissions too. The customers could even invest more in their current vehicles because of the new customization era. *(Corwin S., Vitale J., Kelly E., Cathles E, Deloitte 2016).* This will change the options and the design of the existing vehicles. This new maret segment could offer lighter, smarter vehicles, with very different design.

The most important trends and findings are those connected with the introdution and launching the automous vehicles.. The connected vehicles are developing rapidly – all the innovations which are integrated, the communications technologies and IoT – in order to ensure important services for the drivers. (*Ninah et al.*

2015). The vehicles equipped with communication control equipment and sensors, which allow vehicle-to-vehicle (V2V) communication and vehicle-to-infrastructure (V2I) communication, could proactively to offer various routes in order to avoid risks on the road, or to call for help in case of accident. (Onstar.com, bmw.com). The companies continue seriously to invest into such technologies. The vehicles receive precise information about their location on the road compared to the other vehicles, hazardeous situations, so to take precautions to avoid accidents. (*Yvkoff L., 2015*). Along with these innovations, the change of the behavior of the Generation Y is taking place. They go for pay-on-demand personal mobility models, rather than buying and ownership of assets. This fundamentally changes the consumer model of personal ownership of vehicles. (*Giffi C, Vitale J., 2014*) The system which has been developed for a century is about to be transformed, which will create whole new ecosystem. (*Tansley A., 2012*) for personal mobility. It is still arguable whether the automotive industry will continue to develop towards this future ecosystem for mobility or the changes will be even more radical. It can't be forecasted precisely now how exactly the industry and the existing structures will change, what kind of new business models will appear, what are going to be the value propositions.

Future mobility

There are two opposite visions for the future mobility. *(Corwin S., Vitale J., Kelly E., Cathles E, Deloitte 2016)*. The fundamental differences lay in the alternative whether today's system with personally owned vehicels, driven by humans will stay relatively unchanged, or we are going to shift into a system of self-driving, autonomus, vehicles shaped by dominating shared mobility. There is critical difference in the ways this to happen. So called "Insider" point of view believes thet the current system could progress in a way that in its basis it stays unchanged. The "Disrupter" point of view foresees disruptive approach towards very different future. The authors offer four future states of personal mobility based on two important tendencies – vehicle control (driver vs. autonomy) and vehicle. ownership (private vs. shared).

The new era of affordable mobility requires converging the tendencies of self-driving vehicles and the shared vehicels. In this future the companies should offer new value, new range of experiences and services for the passengers, to meet their various needs, at various price levels. (*Vanderveen C., 2014*). The connevtivity and IoT will give opportunity for direct link between home, appliances, and vehicles. The autonomous vehicles could be programed to optimize the comfort of the occupants. (*Le Vine, Zolfaghari* and *Polak J., 2015*)

The early addopters of the autonomous and connected technology would be people travelling to work in some of the biggest cities, for the sake of faster transits, shorter distances and improved routes due to the provided real-time data and information. Until the expansion of the smart infrastructure and its usage become to a breakpoint, the fleet of the autonomous vehicles could spread from the downtown of the cities to their high populated suburbia. The advanced communication technologies will coordinate the transits from place to place. Intuitive interfaces will allow the consumers to e-hail a vehicle to pick them in a minutes, and to travel safely and cost-efectively. The vehicles and the traffic system operators, the service providers inside the vehicles and the data and metadata owners could find new opportunities to monetize the cost providing new experiences to the passengers.

The autonomous vehicles are just one of the several factors influencing the future transportation and costs. The demographic tendencies, the changing consumer behavior and preferences, IoT, price changes, improved transport options, information flows, as well as other innovations and tendencies, will seriously influence how and how much people drive and travel. These factors will be still predominant over the autonomous vehicles at least by 2040. *(Litman T., Victoria Transport Policy Institute, 2017)*

The autonomous technology and opportunities will resut in more shared vehicles, more autonomous taxi cars and more sharing of the priately owned vehicles. (*Fagnant D. and Kockelman K. 2013; Schonberger and Gutmann 2013*). The possibility of one household vehicle to serve many users, could decrease the ownership with 43% and to increase the mileage with up to 75% *(Sivak M. and Schoettle B., 2015*). The potential benefits which the advocates of autonous technology foresee are the significant convenience, safety, congestion reduction, fuel efficiency, energy savings pollution decrease. Human mistake causes 93% of the road accidents and the autonous vehicles will decrease these accidents by 90% (*KPMG 2013; Fagnant D. and Kockelman K., 2015*), incl. the system errors ("death by computer"), cyberterrorism (*Bilger B., 2013*), and wil compensate the risk of the human behavior on the road and the side effects such as increased traffic caused by the faster or more cost-effective way of travel. (*Ecenbarger W., 2009; Fung B., 2015; Kockelman, et al. 2016; Lin P., 2013; Ohnsman A.,2014*). The decrease of privately owned vehicles will decrease the parking issues. The necessity of conventional public transport services will also decrease. To have clear and visible benefits of the self-driving cars, dedicated autonous vehicles lanes will be required, which will change the infrastructure of the cities. *(Litman T., Victoria Transport Policy Institute, 2017)* The autonous vehicles will solve the parking issues, but they will reduce the the important incomes for the cities by parking. Besides the drives, other professional occupations will disappear. If the accidents on the road are reduced, then industry working on this will be seriously changed. This indludes insurance business, aftersales, repair shops and workers, spare-parts suppliers etc.. (*Anderson J. et al. 2014, Rand.org)*

It's the main trend in the new cars marketing – the transformation of the traditional conventional cars into autonomous, with sharing between many consumers, with smart options for management, e-hailing, and providing personal and customizable services inside, thus transforming it into new type of media. When the autonomous vehicles become bigger part of the fleet on the road and most of the transits are autonomous, they could reduce significantly the risk on the road, congestions, parking issues, as well as to ensure energy savings and reduction of the CO2 emissions. *(Litman T., Victoria Transport Policy Institute, 2017).*

The autonomous driving

This innovative technology can be understood in five ways of driving, proposed by **National Highway Traffic Safety Assiciation** (NHTSA, www.nhtsa.gov), which provides various benefits, depending on the autonomy level:

- Level 0: the human drive does everything;
- Level 1: an automated system on the vehicle can sometimes assist the human driver conduct some parts of the driving task;
- Level 2: an automated system on the vehicle can actually conduct some parts of the driving task (e.g. wheel and acceleration), while the human continues to monitor the driving environment and performs the rest of the driving task;
- Level 3: an automated system can both actually conduct some parts of the driving task and monitor the driving environment in some instances, but the human driver must be ready to take back control when the automated system requests;
- Level 4: an automated system can conduct the driving task and monitor the driving environment, and the human need not take back control, but the automated system can operate only in certain environments and under certain conditions (or fully automated driving)
- Level 5, the automated system can perform all driving tasks, under all conditions that a human driver could perform them (or driverless operation)

The autonomy could increase the mobility of those who are not able or don't want to drive. At level 4 there the technology will be

able to give a ride to disabled people, blind, or those who are too young to drive. This will give independency, reducing the social isolation and access to public and private services.

At level 3 or higher, could be reduced the congestion costs, as the occupants can perform various tasks within the vehicle – work, have a rest, watch TV, read etc.

Level 3 could also increase the longer commutting. This could make the people to settle at far distance from the main part of the cities. The autonomous vehicles could lead to higher spread of the population and usage of less populated areas around big cities. However inside the metropolis areas it could lead the population density due to the reduced need of parking space. At Level 4 the autonoums vehicles could just leave the occupants at their destination and to drive to satellite parking zones, leading to potential decrease of car ownership. *(Litman T., Victoria Transport Policy Institute, 2017).*

Litman T. continues to argue on other potential benefits of the autonomous technology. The overall effect on the energy usage and pollution is stil not clear, but it seems both will be decreased. The autonomous vehicles will alow fuel efficiency, allowing acceleration and breaking 4-10% smoother than by humans. The other imnprovements could include less distance between the vehicles leading to road capacity incremental. The platooning suggests less stops or speed changes. It allows lower speed (meaning fuel economy), but more effective overall speed, meaning improved time for travel. As the accidents suppose to be reduced with time, the cars and the trucks will have lower weght, which will increase fuel efficiency. The autonous vehicles would decrease the air pollution by using alternative fuels and powertrains. If the accidents reduction allows lighter vehicles, then this will solve lots of the issues with the electric vehicles range, resulting into higher demand. At Level 4, athe vehicles could drop off their occupants at the given destination and continue to the charging station or to the gas station by themselves. Still it is a disadvantage the lack of developed charging infrastructure for the alterantive fuel vehicles.

Litman T. argues on potential disadvantages as well. Many of the disadvantages exist in the benefits themselves. As the autonomous vehicles would decrease the congestion cost and would improve fuel efficiency, they would decrease the personal cost for driving. Due to this fact and increased mobility of people who are not able to drive, the total vehicle-travel would increase leading to negative external effects like congestion and increased fuel economy. However, despite of the congestions, the techology could could increase the road permeability due to the more effective vehicle operations and the overall delay due to decreased. The autonomous driving capability will probably increase vehicle purchase prices by thousands, and may require hundreds in annual subscription fees for special assistance, navigation and mapping services. The analysis suggests that effects which increase vehicle travel are more numerous and significant than those that reduce vehicle travel, so self-driving vehicles are likely to increase total vehicle travel, although these impacts are difficult to predict and will depend on specific autonomous vehicle implementation, such as their performance, technical matters, user costs, fuel and road prices**.**

A research (*Burns L., Jordan W., Scarborough B., The Earth Institute, Columbia University 2013*) presents three different scenarios to evaluate the personal mobility. They combine mobile internet, autonomous vehicles, shared automotive systems, specific-purpose vehicle design and advanced powertrains. The results show that this new mobility system has the potential to provide better overall performance at lower cost at varilus conditions. It provides significant benefits for sustainability through improved rpd safety, reduced congestions, energy savings, lower emission levels, efficient space and land use and equal rights for travel and acces. It suggests several models which define the connection between the geographical regions and the cost and performance of the coordinated shared autonomous mobility systems.

It is possible now to be provided better ways for mobility at lower cost for the consumers and society. This opportunity is a result of combination of five technological and business enablers:

- “Mobility internet” does for the movement of people and goods, what Internet has done for the movement of information by coordinating large amounts of real-time data.
- Self-driving vehicles operatate without human control, allowing to occupants to spend their time in the vehicle as they please, without endanger themselves or the others on the road.
- Shared vehicles are by several people throughout the day rather exclusively by individual drivers who leave them parked 90% of the time during the day.
- The specific-purpose vehicle design is developed to respond to the type of mobility and the number of occupants they serve, which makes them efficient to energy, space and cost compared to the conventional vehicles.
- The new advanced powertrains allow the usage of alternative sources to move the cars and trucks. This includes electric drive, electric motors and electronic and digital control in addition or separately to the regaular combustion engines. Individually each of these are significant advantage to the contemporary transport infrastructure. Combined in a new innovative way to enhance the customers’ experience in the vehicles, they bring drastic improvements and transformational changes.

The new mobility system can improve people’s life which is shown via three exmaples and analytics models, give by the authors. The new system combines the existing developments in the autonomous vehicels with the emerging of the mobility internet, which could coordinate the movement of the vehicles in space in time. The new mobility could work if optimally sized shared fleets of driverless, coordinated, specific-purpose vehicles are available. The customers could request a ride via app on their smartphone. An autonomous vehicle arrives at their door within few minutes and gives them a ride straight to their destination. During this trip the occupants can use their time as they are pleased. (reading, eating, talking on the phone, working, sleeping, watching a movie, listening to music). Futhermore, personalized playsists could be offered to the custmores based on their entire mobile experice, browsing and made choices during their previous trips. Upon arrival, the vehicle leaves the passangers and continues to its next destination for next client, without any need to park anywhere.

The authors conclude that, by combining the five business and technological factors, could be achieved much better performances at lower cost. This new mobility system is more attractived in comparison to the other ways for public transport, due to its potential to be more convenient, more energy- and resources efficient, more cost-effective, and much safer and cheaper. The shared vehicles bring this efficiency, which lead to cost-saving. The econy of scale could be reached rapidly, the autonomous vehicles are comfortable for the consumers. The results are similar in the different types of cities. The benefits for sustainable growth are significant with the autonomous shared vehicles.

The autonomous vehicles can impact also flying experiences. (*Schwab K., 2017*). It is foreseen that 54 million autonomous vehicles will be on the road by 2035 and it is projected that nearly every vehicle will be autonomous by 2050 (*IHS Automotive, 2014*). The ease and convenience of using a self-driving car for six or seven hours while working remotely or sleeping could mean fewer short-haul flights. The convenience of self-driving cars could force airports to rethink their entire experience design – baggage, check-in, security lines. To compete with self-driving cars, the airlines will have to shift the services they’re offering. Most importantly, they may need to offer door-to-door service, picking up customers from their homes or convenient pick-up locations and delivering them directly to the airport. That’s something that

already happens in luxury travel. Plane manufacturers are thinking about autonomous vehicles as well. In collaboration with Italdesign, Airbus recently released a concept vehicle that's part self-driving car, part self-driving drone.

Self-driving cars will likely fundamentally alter the nature of the airport itself. They could eliminate the need for parking structures, since people's cars can drop them off and simply drive back home. When the parking structure is not longer needed, airports will have a large chunk of real estate that could be turned into hotel conferencing rooms.

The rise of the self-driving cars will have serious impact on the society. It can be identified ten developments in three eras, in connection with the self-driving cars. (*Bertoncello M, Wee D., 2015 McKinsey&Company*). These vehicles are serious innovation for the automotive industry, but their potential influence as time, adoption and penetration are not clear. The self-driving vehicles could really play crucial role for the economies, businesses, industries, mobility and society. To clarify these issues, the authors interview 30 experts globally and then the information is combined with data by Automotive & Assembly and High-Tech Practices, to be proposed relevant point of view for the impact of the new type of vehicles.

First era is focused on the conditions before the autonomous vehicles being on the market for use by the consumers, or at the phase of development and new mobility models begin to emerge. The second era argues on the autonomous vehicles at the phase of early adoption, and the last era projects the changes which could follow when the autonomous vehicles become primary means of transportation.

***Fig.1**: Self-driving vehicle revolution. Source: McKinsey& Company*

Conclusion

Both automotive and tech industries are working to present something radically different and innovative than the current existing vehicles. The tendency fully autonomous, shared, electric, vehicles on demand is about to happen, bringing additional innovative business models and services, which to be researched and analysed from now on. It is expected a world in which:

- The vechicles do not crash. Autonomy eliminates the cause for almost all accidents – the human mistake; Connectivity between the vehicles themselves and real time data and connectivity with infrastructure allow communication about potential danger on the road too;
- The congestions happen rarerly, due to the sensors integrated in the vehicles, which allow less space between them, as well as integrated communicational systems for traffic management with real time data and information about the congestions.;
- The energy demand is less as the smaller and lighter vehicles allow compact, fuel-efficient and eco-friendly powertrains;
- The travel costs fall, due to the higher utilization of the assets, i.e. shared driving and economy of scale;
- The infrastructure is financed by fees for the actual real consumption and use, as the connected vehicles technology allows precisely the personal costs for usage of the roads;
- The parking spaces disappear, as the rise of the the autonomous vehicles and shared rides eliminate them. The land and the space inside the cities could be used in favour of citizens and green strategies for sutainable development.;
- The authorities stop dealing with the traffic matters, because the autonomous vehicles are programmed not to break the rules and the traffic laws;
- The speed of deliveries increases, and the costs are reduced, due to the rise of fully autonomous networks for truck travels and/or platooning, which operate longer and with less human interaction
- The seamless multimodal transport is becoming mainstream, as the improved system interactions allow the consumers to travel from A to B via multiple connected ways of transportation at fixed price, charged by unified payment system.
- New business models and alliances rise between automotive industry and tech industry creating new supply and value chanins in order to provide new mobility, transforming the vehicles into service, and bringing additional value models for the customers, i.e. provision of personal and customizable services inside, thus transforming it into new type of media

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