Responsibility driven design for the future self-driving society

Autonomous systems and the complex challenges to designing a responsible, driverless future

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Since 1994 the Giannino Bassetti Foundation has promoted responsible innovation. Within both the national and international setting it helps institutional, private and associational actors to orient their goals and consider them a factor of interest for the entire society.
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The key role of responsibility in designing the driverless society of the future

First imagined and foreseen, then prototyped and tested, today driverless cars are real. The inevitable transition to autonomous transportation, with its enormous potential and connected risks, has achieved awareness within the public, government, and an array of stakeholders involved in digital technology evolution. Mobility automatization will not only have an impact on the transportation industry however, it will in reality lead to the transformation of the socio-cultural fabric of countries all over the world: habits and behaviour will change, new products and services will improve people’s lifestyle, cities will reshape and, above all, the society will transform itself in its complexity. The conversation cannot be limited to the driverless ‘car’ or autonomous ‘transportation’, but is more realistically addressed as what Giulio Ceppi for his course in Integrated Product Design at Politecnico di Milano, defined as the self-driving society as a whole. On the
one hand, this broader perspective allows stakeholders to identify a richer scenario for opportunities and innovation, and on the other, it compels all actors to develop and better articulate the discourse on the societal impact of this technological transformation, still relegated today to narrowly defined and rather isolated topics (ethics, safety, cybersecurity, etc...).

But responsibility does not only mean taking on the burden of preventing undesirable consequences; in fact, adopting a structured responsibility-driven approach could also mean uncovering new possibilities for innovation and the capability to remain relevant in the long term.

This positive positioning by the Giannino Bassetti Foundation emerges from 24 years of experience in fostering responsible innovation. This vast experience has once more been strengthened through a recent collaboration with Giulio Ceppi and the Design School of the Politecnico di Milano, within which I was invited to conduct a workshop together with Francesco Samorè in November 2017, with the aim of putting design at the service of the self-driving society of the future.

The results of the workshop (described in this paper) demonstrate how using a design-driven approach in conjunction with a perspective centered on responsibility can lead to the envisioning of unexpected and interesting scenarios. This white paper expands upon the experience and marks the wish of the Bassetti Foundation to continue this work and invite all interested stakeholders to join the conversation. Automotive industries, courier companies, software providers, big data and artificial intelligence corporations, designers and engineers, investors and insurers, universities and policymakers, CSOs and citizens, to name just a few of the players that will be directly involved in shaping the self-driving society of the future.

To be relevant in this new technological and cultural transition all stakeholders must embrace innovation and adopt the broadest perspective possible, but it doesn't stop there: we are entering a technological era in which automation will take control over our lives (quite literally). A responsibility-driven approach should be the key factor to a better future, more efficient in terms of economic growth and more desirable for societies all over the world.
01.

THE GOAL

Empowering the future stakeholders of the self-driving society through vision and design thinking

1.1 Responsibility Matrix
1.2 The Collingridge Positioning
“Design approaches are applied all over the world as a powerful approach to innovating public policies and services. But more is at stake: the future of how we run government. Bringing design methods in play, public managers can lead change with citizens at the centre, and discover a new model for steering public organisations: Human-centred governance”

Christian Bason, CEO of Danish Design Centre and author of Design for Policy
02. THE SCENARIO

What will the future of autonomous transportation look like? Case studies

2.1 The Future of Automobility by IDEO
2.2 Waymo by Google
2.3 F015 by Mercedes-Benz
2.4 Next Future Transportation Inc.
2.5 Airbus Pop-up by Italdesign
2.6 Parcelcopter by DHL
2.7 Public Square for Driverless Future
2.8 Autonomous Urbanism by NACTO
The World Economic Forum estimates that the digital transformation of the automotive industry will generate **$67 billion** in value for that sector and **$3.1 trillion in societal benefits**. That includes improvements from autonomous vehicles, connected travelers, and the transportation enterprise ecosystem as a whole.

from *Moving forward: Self-driving vehicles in China, Europe, Japan, Korea, and the United States* by Darrell M. West, Brookings Institution
The Future of Automobility

by IDEO

The Future of Automobility is an online visualization of how life with driverless cars might really look and feel. It considers four scenarios: “Moving People,” which looks at how commutes will change when we can look away from the road; “Moving Things,” where we examine automated package-delivery fleets; “Moving Spaces,” where we envision mobile offices meeting people where they live and parking in underused areas of our cities; and “Moving Together,” which explores how the interior of future vehicles will be customized to meet our personal needs during ride-sharing.

https://automobility.ideo.com/

redefining the space inside vehicles and the overall experience of commuting
more and more shared, but with a personalized experience...

...that goes beyond simple commuting
Key responsibility topics in the domain of autonomous transportation

3.1 Ethics and safety
3.2 Cybersecurity
3.3 Privacy
3.4 Accessibility and equality
3.5 Human compliance
3.6 Environment and sustainability
3.7 An integrated approach

Preview version. Full paper available at selfdrivingsociety.fondazionebassetti.org
“My whole career, people have been saying: We wish we could have known the social costs of driving, we would have done this differently. Policymakers have to think about this now, because the decisions they make affect the landscape for a century.”

Constantine Samaras, professor of civil and environmental engineering at Carnegie Mellon University
The ethical dilemma of self-driving cars

Lesson by Patrick Lin for TED-ed


Self-driving cars are already cruising the streets today. And while these cars will ultimately be safer and cleaner than their manual counterparts, they can’t completely avoid accidents altogether. How should the car be programmed if it encounters an unavoidable accident?

- **The unexpected event.** A heavy object falls right in front of a self-driving car.
- **Situation A.** An SUV on the left and a motorcycle on the right.
- **Situation B.** A motorcycle at either side, one of the two drivers isn’t wearing a helmet.
How a Self-Driving Uber Killed a Pedestrian in Arizona

by Troy Griggs and Daisuke Wakabayashi for New York Times, March 2018


A woman was struck and killed on Sunday night by an autonomous car operated by Uber in Tempe, Arizona. It was believed to be the first pedestrian death associated with self-driving technology. [...]
04. GOVERNANCE

An overview on the current efforts in governing such a complex transformation

3.1 USA: Automated Driving Systems. A Vision for Safety
3.2 Europe: On our way towards connected and automated driving in Europe
3.3 Germany: Automated and Connected Driving
3.4 UK: Cyber Security for Connected and Automated Vehicles
3.5 USA: Blueprint for Autonomous Urbanism
3.6 Australia: Guidelines for trials of automated vehicles
3.7 China: Guiding Opinions for the Beijing Road Tests
3.8 Singapore: Road Traffic (Amendment) Act 2017

Preview version. Full paper available at selfdrivingsociety.fondazionebassetti.org
With the Declaration of Amsterdam on connected and automated driving, member states, the European Commission and private sector have agreed on joint goals and joint actions to facilitate the introduction of connected and automated driving on Europe’s roads. This should prevent a patchwork of rules and regulations arising within the EU, which would be an obstacle to both manufacturers and road users.


On 14 April 2016 at the Informal Transport and Environment Council in Amsterdam, 28 EU Ministers of Transport endorsed the [Declaration of Amsterdam](#) to work towards a more coordinated approach enabling the introduction of connected and automated driving.
Key principles

The guidance calls for automakers and other entities to focus on 12 areas related to safety:

1. System safety, or vehicles free of “unreasonable” safety risks
2. Operational design domain, or the conditions or geographic areas where the vehicles can operate (can they drive in rain, or on gravel roads?)
3. Object and event detection: Testing entities should have a documented process for assessing and testing their vehicles’ ability to avoid pedestrians, bicyclists, animals and other potential road hazards
4. Fallback to “minimal risk condition,” or, if a vehicle malfunctions, how quickly can it be brought to a state where it can’t do any harm?
5. Validation methods: Testers should develop validation methods to mitigate the safety risks of their systems
6. Human-machine interface: How do the vehicles communicate to their passengers, especially the ones that don’t have traditional controls?
7. Cybersecurity: Companies testing systems should incorporate best practices and design principles from NHTSA, the National Institute of Standards and Technology, SAE International and others to keep their vehicles from being hacked
8. Crashworthiness: What happens when non-automated vehicles run into automated vehicles, and how will the AV occupants be protected?
9. Post-crash behavior: How can AVs be made safer after an accident, such as by shutting down a fuel pump or moving the vehicle out of the roadway?
10. Data recording: Learning from crash data will be critical to the development of safe vehicles. NHTSA is working with SAE International to establish uniform data elements for crash reconstruction
11. Consumer education and training: Vehicle testers and dealers need to be able to accurately describe how their vehicles work
12. Federal, state and local laws

Short list taken from: http://www.auvsi.org/
During the High Level Meeting in Amsterdam on 15 February 2017 the participating Member States, the European Commission and industry concluded that developments in connected and automated driving have further accelerated since the Declaration of Amsterdam. In order to be ready for the deployment of connected and automated driving in 2019 the execution of the actions in the declaration should also be accelerated. Member States should cooperate more intensively on actions that need to be executed on a national level. Therefore, the participating Member States, the European Commission and the automotive and telecom industry in this High Level Meeting arrived at the following eight conclusions:

1. Continue Informal High Level Meetings
2. Adopt a joint European approach
3. Assess the use of data
4. Develop Vehicle to Vehicle and Vehicle to Infrastructure Communication
5. Foster cross border testing
6. Close cooperation in UN-ECE34
7. Work with coherent international, European and national regulation
8. Starting work with the shared agenda
Envisioning and designing the responsible driverless society of the future

1.1 The design workshop
1.2 The concepts
If we think of self-driving cars as regular cars with the self-driving addition, we will end up having the same traffic issues, congestion issues and pollution issues that we have today.

Tommaso Gecchelin, founder & CTO of NEXT Future Transportation Inc.
Self-driving cars could make jaywalking legal

Self-driving cars could convert cities into pedestrian paradises.

In 1920, the term “jaywalker” was controversial, according to Peter D. Norton, author of “In Fighting Traffic: The Dawn of the Motor Age in the American City.” It was popularized as a putdown for someone who didn’t know how to walk properly in a city. In 1965, a law passed in Los Angeles making the move illegal and police arrested some offenders.

Jaywalking is still generally illegal, but not the rule is often not enforced. If streets are occupied by self-driving cars in the future, perhaps the biggest shift in city culture, according to NACTO, would be how easy it would be to cross streets.

Rethinking Pedestrian’s Rights

"The autonomous revolution will be humanized."

One century ago, as the automotive age swept across the nation, cities responded not by adapting cars and trucks to the varied uses of the street, but with a relentless clearcutting of urban roads, removing all obstacles from curb to curb— including pedestrians—and all but eliminating street life. Subsequent generations of urban planners built upon this, hollowing out downtown urban cores with congestion and traffic danger, replacing housing with parking lots, and eviscerating urban economies.

Today, in the second decade of the 21st century, and as we anticipate the arrival of self-driving vehicles on city streets, we have a historic opportunity to reclaim the street and to correct the mistakes of a century of urban planning. This adaptation starts with a plan.

—Janette Sadik-Khan

by Suo-Yu Chang
With self-driving system approach, traffic signals will be not necessary to appear for directing traffic, and vehicles will drive more carefully to ensure pedestrian’s safety. To give back the freedom to pedestrians on the road, urban social responsibility manager could reconsider the real thoughts of how people want in public space of the city. Taking both people’s right and traffic flow into account, the aims of this project is trying to make people travel in city more conveniently, but not influences the traffic. By setting up multi-pavements between lanes and controlling vehicles’ distance and speed, pedestrians can cross almost everywhere along the road. Priority will also change according to the traffic volume (divide the nearby changing rule), in other words the road will give more lanes to vehicles during rush hours in order to avoid traffic congestion.
The Fondazione Giannino Bassetti came to life in Milan in 1994, and became a Foundation of Participation in 2016. In coherence with the values expressed by the Bassetti family, the Foundation’s aim is to promote responsibility in innovation within both the national and international setting, helping institutional, private and associational actors to orient their aims and goals and in considering them a factor of interest for the entire society; both in the techno-scientific field and regarding governance models.

The Foundation of Participation aims to:

- contribute to making all of the different actors that participate in innovation decisions aware of the consequences and responsibilities that their roles entail;
- to support the relationship between civil society and its institutions, contributing to scientific research and developing tools for the spread of responsibility in the technosciences, life sciences together with biomedical and oncology laboratories, in bioethics, in governance, in finance, and in business;
- participate in international projects and consortium, contributing to the evolution and development of the definitions given to responsibility and innovation by the European Union;
- collaborate with public entities in the promotion of governance projects that lie within the specific competences of the Foundation and its collaborators, participating within organizations that operate in similar fields and forming project partnerships in collaboration with other entities tied to public administrations.

In the 1994 Statute, the objective to “create a new and renewed awareness around the memory of a precedent, a modern and widespread sense of social, civil and political responsibility amongst those who innovate” was set.
Per maggiori informazioni e per scaricare gratuitamente il paper integrale:

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