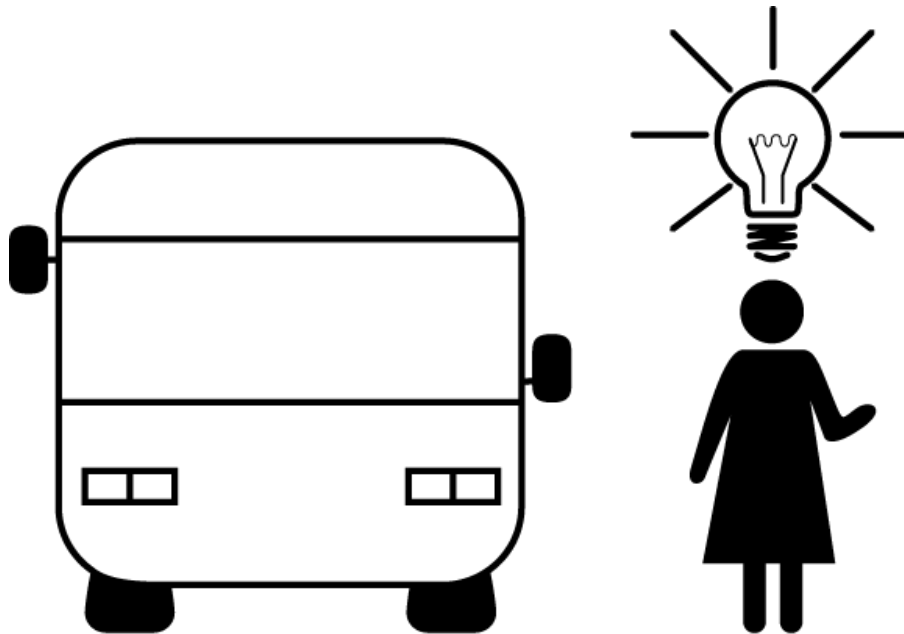


PayPer

Paying for Performance in Public Transport



Think Outside the Bus

Project within FFI - Effektiva och uppkopplade transportsystem

Julia Jonasson, Volvo Group Trucks Technology

March 2015



Content

1. Executive summary	3
2. Background	4
3. Objective	5
4. Project realization	6
4.1 Explore	7
4.2 Conceptualize	7
4.3 Build.....	8
5. Results and deliverables	8
5.1 Delivery to FFI-goals	8
6. Dissemination and publications	9
6.1 Knowledge and results dissemination	10
7. Conclusions and future research	10
8. Participating parties and contact person	13
9. Appendix I	14

FFI in short

FFI is a partnership between the Swedish government and automotive industry for joint funding of research, innovation and development concentrating on Climate & Environment and Safety. FFI has R&D activities worth approx. €100 million per year, of which half is governmental funding. The background to the investment is that development within road transportation and Swedish automotive industry has big impact for growth. FFI will contribute to the following main goals: Reducing the environmental impact of transport, reducing the number killed and injured in traffic and Strengthening international competitiveness. Currently there are five collaboration programs: **Vehicle Development, Transport Efficiency, Vehicle and Traffic Safety, Energy & Environment and Sustainable Production Technology.**

For more information: www.vinnova.se/ffi



1. Executive summary

The objective of the project has been to develop and evaluate business models and supporting technologies to facilitate pay-for-performance solutions in public transport. In PayPer we have also investigated the use of contracts as an instrument for steering and managing the contracted work as well as managing and developing the relationship between the contract partners.

The project aimed to do this at two points in the value network.

1. Between public transport authority and public transport operator (PTA-PTO)
2. Between bus manufacturer and public transport operator (OEM-PTO)

One very important aspect has been to ensure that that the different relationship levels are not steered by conflicting incentives.

PTA has been represented by Värmlandstrafik AB and Hallandstrafiken AB, PTO by Nobina AB, the participating OEM has been Volvo Bus Corporation and the academic partner has been SAMOT, the service and market oriented research group at Karlstad University. The project has been managed by Volvo Group Trucks Technology.

The project has been running along two parallel tracks, each focusing on one level of relationships in the value chain. The relationship between PTA and PTO has been the main responsibility of SAMOT, whereas the relationship between PTO and OEM has been the main responsibility of the team from Volvo Group Trucks Technology.

The work in the PTO-OEM part of the project has been conducted in accordance with the Volvo Group global service development process, S-GDP. This process is based on theories of ideation and iterative development and has five phases: explore, conceptualize, build, pilot and deploy. PayPer has taken the project from explore to build.

During the build-phase PayPer developed a concept which complements existing cooperation agreements with a clear meeting structure for daily, weekly, monthly and yearly meetings. Each meeting type has a set agenda and appointed responsible representative from each of the participating organizations (PTO-OEM).

To make sure the meeting covers the appropriate subjects and that decisions are made based on the right information PayPer developed a report structure with data collected directly from the buses, systems at the PTO and systems at the OEM. In the reports all data is collected and presented in a simple and understandable way to make it suitable as the basis for fact based decisions.



All collected data can also be used as the basis for financial compensation/payment as it shows the actual use of the bus, availability, accessibility, results of different kinds of inspections, how they were driven, the energy consumption, CO2 emissions etc.

The PayPer concept has not yet been fully implemented. But we do see that a movement towards performance based contracts has taken place under the duration of the project. In a recent tender process for Värmlandstrafik AB the tender winner was Nobina AB. Nobina AB in turn chose to cooperate with Volvo Buses in a less traditional way, leaving a larger responsibility for the state of the vehicles to Volvo Buses, asset management. This allows Nobina AB to focus on their core business, to plan and handle the transport of people in public transport, transport management.

One likely effect of the transition towards incentive and performance driven contracts that is happening in the public transport business is that the PTA will start asking for effects (lower emissions, increase in travels, easier for passengers to change transport mode at traffic hubs etc.) rather than for specific technologies or design features (choice of propellant, number of passengers etc.). One likely effect of this is that the PTO's role will also shift, allowing the PTO to focus on traffic- and transport management to reach the wanted effects, rather than on reaching arbitrary goals that do not create better public transport for the travelers.

With the PTO's change in focus, to planning and executing public transport and away from owning and maintaining a fleet of vehicles we can assume that it will influence the relationship with the OEM, creating a demand for the OEM to take on more responsibility for the vehicles in operation. It is probable that the OEM will become more of a partner for delivering transport capacity rather than being just a deliverer of vehicles.

A growing importance and impact of performance based contracts will highlight the fact that decisions made in any part of the value chain impacts the other parts of the chain. It is therefore important that the incentives of all partners support each other to reach the best effect for the whole of Public transport.

2. Background

Making the transition into performance based business models such as "power by the hour" contracts have become a reality in many industries (IT, telecom, airlines). Implementation has not yet been reached in the public road transport which is lagging due to low profit margins, fragmentation and the challenges involved in monitoring mobile equipment in real time.

External pressure from society (environmental concerns, efficient use of public resources) and passengers (affordable prices) is however forcing public transport authorities/organizers (PTA) to pressure public transport operators (PTO) to reduce costs



and account for environmental impact. PTOs are cascading these demands on bus manufacturers.

Bus manufacturers have their own reasons to pursue pay-for-performance business models. The competition from e.g. low cost manufacturers based in Asia is expected to increase severely in the coming decade, and the growth of a competitive aftermarket offering and a focus on quality and reducing life cycle costs are seen as one way to counter this challenge.

The PayPer project aims to develop and test business models and supporting technology to let PTAs pay PTOs according to performance (i.e. CO₂ footprint/passenger, passenger satisfaction, timeliness etc.) and PTOs pay original equipment manufacturers (OEMs) based on availability, instead of what is currently common practice, buying a specific number of vehicles.

Looking at it this way, PayPer is a vessel to prove that there are alternatives to the inflexible transaction based contracts that to a large extent still are the norm in public transport today. The transaction based contracts are also poorly suited when considering the complete value chain of public transport and they can in turn lead to incentives on different levels in the value chain contradicting each other.

3. Objective

The objective of the project is to develop and evaluate business models and supporting technologies to facilitate pay-for-performance solutions in public transport. The project aims to do this at two points in the value network.

3. Between public transport authority and public transport operator (PTA-PTO)
4. Between bus manufacturer and public transport operator (OEM-PTO)

The general idea is to investigate how Volvo can contribute to a system where public transport organizers (Värmlandstrafik and Hallandstrafiken) can monitor and evaluate the performance of a public transport operator (Nobina) in terms such as customer (passenger) satisfaction, life cycle cost, efficiency, CO₂ footprint/passenger kilometer. The system also needs to cater to the relationship between PTO and OEM and assist the PTO to monitor and evaluate the performance of the OEM in accordance with the agreed demands on vehicle availability.

Systems like this could be used by the PTA to:

- Pay its operators according to performance.
- Rank its operators and use the ranking in future requests for quotations on public transport contracts.

In addition similar technology can be used to monitor LCC¹ for the bus operation. Volvo can use collected data to provide the operators with an option to pay for actual use of the vehicles.

One critical point in this is the creation of a win-win relationship where PTA, PTO and OEM will benefit from improving their performances.

4. Project realization

The project has, as stated earlier, had two parallel work streams, focusing on the two levels and relationships in the public transport value stream. The relationship between PTA and PTO has mainly been covered by work performed at SAMOT, the center for service research at Karlstad University.

The relationship between PTO and OEM has mainly been covered by work performed at Volvo Group Trucks Technology.

The implementation of the PTO-OEM focusing part of the project has been conducted using the Volvo Group global service development process, S-GDP. This process builds on the theories of ideation² and iterative development. The process consists of five phases: Explore, Conceptualize, Build, Pilot and Deploy. In PayPer the ambition was to take the development all the way from Explore to Pilot. During the progression of the project however the project conditions were altered and the project was able to bring the project development from Explore to Build.

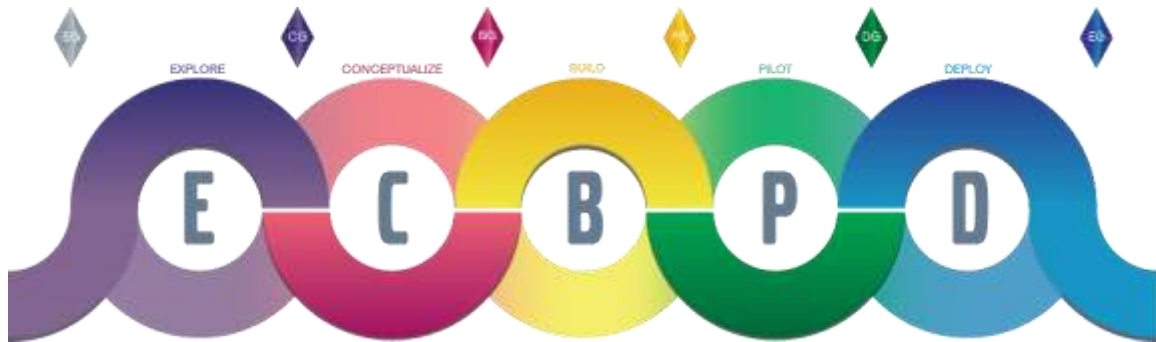


Figure 1 S-GDP Service development process at the Volvo Group

¹ Life Cycle Cost – the total cost of any equipment throughout its lifetime in use.

² Ideation is the creative process of generating, developing, and communicating new ideas, where an idea is understood as a basic element of thought that can be visual, concrete, or abstract. Ideation comprises all stages of a thought cycle, from innovation, to development, to actualization. As such, it is an essential part of the design process, both in education and practice.

[[http://en.wikipedia.org/wiki/Ideation_\(idea_generation\)](http://en.wikipedia.org/wiki/Ideation_(idea_generation)), 2015-03-18]



4.1 Explore

The first phase in the development process focuses on gathering of information and studies on the requirements and conditions of the project. Time was spent on collecting and analyzing earlier research on the transition of traditional product producing companies, with transaction based contracts and payment methods, into service delivering organizations with performance based and incentive driven contracts and cooperation agreements. The result of this analysis was then the foundation for the development of interview guides used in interviews conducted with the project partners (PTA, PTO,).

An analysis of the interviews was then used as a base for a workshop with the entire project team. During the workshop we identified parameters to use for the development of future incentive and performance based contracts. The parameters were then ranked by the project team during the workshop.

A list of the parameters and ranking can be found in Appendix 1.

4.2 Conceptualize

After the interviews and workshops we created a contract concept based on the different parameters identified and prioritized by the project team during the workshops. The concept required telematics³ equipment to be installed on a small number of buses to be used in a concept pilot. The telematics equipment was needed to collect data from the buses in operation to use for building a workable payment model. The pilot was to be approximately one year, but unfortunately there were problems with the suppliers of the telematics equipment and after persistent attempts we were forced to reconsider the pilot. Thus began the next iteration of the conceptualize phase and a new concept was developed.

The final contract concept then was developed based on other results and conclusions from the conducted interviews and workshops. The concept also built on the preexisting cooperation agreements introduced locally in workshops and dealerships. Here we found experience suggesting that even the most well written and deeply considered economic contracts seldom worked smoothly without a plan for cooperation agreed on by both PTO and OEM/dealer.

The cooperation agreement would govern the relationship between, what is traditionally viewed as a transaction between customer and supplier, but that in the case of our concept should be described as a long-term partnership.

³ Telematics is an interdisciplinary field encompassing telecommunications, vehicular technologies, road transportation, road safety, electrical engineering (sensors, instrumentation, wireless communications, etc.), computer science (multimedia, Internet, etc.) [<http://en.wikipedia.org/wiki/Telematics> 2015-03-27]



4.3 Build

During the build phase PayPer used the existing cooperation agreements as a base to develop a meeting structure and a report structure for the incentive driving data that future performance based contracts will build on. The data used in the reports is collected directly from the buses using the existing telematics system as well as from existing systems at the PTO and the OEM dealerships.

5. Results and deliverables

One concrete result from the PayPer project is a concept used to complement the existing cooperation agreements with a clear meeting structure for daily, weekly, monthly and yearly meetings. Each meeting type has a proposed agenda and the roles/people needed in each meeting from both participating partnering organizations (PTO and OEM) are clearly stated. To make sure the meeting covers the right agenda points and that decisions are made at the right level, PayPer also developed a report structure where data collected from the vehicles and from systems at the PTO and at the OEM dealerships is presented. The data is collected and presented in an understandable way and can thus be used as the basis for decisions.

The collected data can also be used as a basis for financial compensation/payment as it also shows how the vehicle has been used: how accessible the vehicles have been, the result of vehicle inspections, how the vehicles have been driven etc.

The PayPer concept has not yet been fully implemented. But we do see that a movement towards performance based contracts has taken place under the duration of the project. In a recent tender process for Värmlandstrafik AB the tender winner was Nobina AB. Nobina AB in turn chose to cooperate with Volvo Buses in a less traditional way, leaving a larger responsibility for the state of the vehicles to Volvo Buses, asset management. This allows Nobina AB to focus on their core business, to plan and handle the transport of people in public transport, transport management.

5.1 Delivery to FFI-goals

Program Targets	PayPer Contribution
How well the project satisfies the targets defined within transport, energy and environmental policy	Enables CO2 monitoring, reward CO2 efficient operations, provides incentives for an efficient and passenger oriented public transport industry which will benefit the realization of the doubling goal
Contribute towards a vehicle industry in Sweden to be competitive	Pay for performance is the greatest aftermarket challenge for Volvo in the upcoming decade. Finding uptime services

	and making the transition is crucial. PayPer develops such a solution.
Leads to industrial technology and competence development.	Significant contribution, new requirements on ITS4Mobility will be generated. Volvo Buses will be trained in pay for performance business models.
Contribute towards secure employment, growth and stronger R&D operations	PayPer sponsor business development activities within R&D at Volvo.
Support environments for innovation and collaboration.	Co-creation methodology supports Karlstad University. Promote industry & academia cooperation.
Strive to ensure that new knowledge is developed and implemented, and that existing knowledge is implemented in industrial applications.	Industrial participation. Goal that business model will be implemented by industry participants at the end of project.
Reinforce collaboration between the vehicle industry and the Swedish Road Administration, universities and research institutes.	Vertical project with research and industry partners. Strong team. Several millions in extra co-funding through CTF-research profile.
Also describe the extent to which the results from the project may be of direct or indirect relevance for the other manufacturing industry.	The trend to move towards solution selling and pay for performance is evident in many different manufacturing industries. The dissipation of knowledge from academic partners will ensure that this knowledge is properly communicated from this industry to others.

6. Dissemination and publications

As stated earlier the total PayPer concept has not yet been implemented, but we see a movement within the public transport business towards performance based contracts. From the university professor Bo Enquist, an appreciated speaker, have worked together with, among others, doctor Samuel Sebhatu and associate professor Carolina Camén to spread knowledge and raise the interest for contract steering and performance based contracts.

We have also noticed interest from other PTAs where Storstockholms lokaltrafik have ordered a smaller study on how contract steering and performance based contract models will affect their mission to provide Sweden's largest city with functional and attractive public transport services in the future.

6.1 Knowledge and results dissemination

In addition to the dissemination of the results for PayPer via this Vinnova paper there is the connection to the consultancy firm hired to conduct the study for Storstockholms lokaltrafik. Karlstad university and SAMOT have provided an interim report for PayPer (available as part of the technical report) where they include different case studies. In addition to this SAMOT has participated in conferences, seminars and are also planning to disseminate the knowledge gained through PayPer in scientific papers, articles and books, among which we find the upcoming title by Bo Enquist *Städer för människor – jämförelsestudie kring pågående transformativa förändrings- och samverkansprocesser av hållbara persontransporter för levande och attraktiva städer* [planned for 2015].

7. Conclusions and future research

Transaction based contract models will soon be, if not replace then at least complemented by performance based contract models. In the PayPer project we have seen that this is already happening and that it is already something that the different partners (from PTA to OEM) in public transport need to take into consideration and adapt to. One probable effect this will have is that the PTA will put out tenders focusing on the wanted effects (lower emissions, more travels etc.) and refrain from specifying the technology to use (type of propellant, number of passengers per bus etc.). This will in turn lead to a partly different role for the PTO, where they can focus on traffic and transport management rather than meeting arbitrary objectives that do not lead the wanted effects.

When the PTO's focus shifts towards planning and execution of transportation and away from vehicle ownership and vehicle maintenance it will be reasonable to assume this will affect the role of the OEM. When custom build buses, different for every PTA specification, are no longer needed to reach arbitrary goals that do not bring greater value to the general public, vehicle design and production will also see a shift in focus towards a more standardized solution.

An increased responsibility for the vehicles and delivery of transport capacity rather than vehicles also makes it plausible that sustainability aspects will get more focus when designing vehicles. The prioritization between designing for efficiency in production and efficiency in maintenance will be affected and it is also probable that LCC will grow to be even more important to consider both for the PTO and the OEM. Therefore we expect to see, with more clarity, the importance of business driving incentives support each other for all business partners and throughout the whole value chain.

With the shift towards performance based contracts we also see cooperation agreements being used separately from the economical agreement that a contract entails and the cooperation agreement is very important in steering and controlling performance based contract models. Without agreed cooperation the performance based contracts will face real problems.



What we have done in the PayPer project is to develop a report structure using data to measure the performance of the contract partners, and using the same data as a base for decision making. Added to the reports is a meeting structure with set agendas, participators and decision making structures. Event information on who is the convener of the meeting is included.

We think that with fully developed telematics and data collection from the systems already in use by the PTO and in Volvo's dealerships we have the possibility to collect enough reliable data from the buses to allow us to measure performance objectively. This in turn allows performance based contract models to have a prominent place in the future of public transport.

At the end of their study (Styrning och navigering i regionala kollektivtrafiknätverk, Karlstad University Studies 2013:14) Enquist and Johnson write that business models and contract steering need to be based on the same business logic. They base this on their study of six public transport networks, where Freiburg and Zürich are seen as best practice. And they write:

The Public transport authorities and the traffic operators collectively shape the service of public transport towards the customer/traveler and they are on the same side in the value network, hopefully driven by the same business logic. In the value network the selected business model needs to correlate to the contracts agreed upon by the traffic operators. In Freiburg and Zürich we see more stable contracts as they are not subject to the same competition as the Swedish contracts.

Free market access has been given much attention in the new laws and regulations, but in the four Swedish public transport networks this is of marginal significance. The traffic operators' business models are adapted to the tender process developed according to previous stable procurement methods where transaction contracts and contracts with only minor incentive based parts have been most common.

With incentive based contracts gaining acceptance and prominence it will become more important for the traffic operators to not be used as employment agencies. Instead public transport needs to be seen as a collaborative business to be fully developed within the scope of contract- and customer dialogues, where the dynamic effects are utilized in the major streets, and other traffic organized as feeder services to hubs to achieve a cohesive system.

[my translation]

Here we find a continuation to contract steering. It is not a static dyad between two parties but must be viewed in a larger context and continued research is needed to find how the remaining parts of society can contribute to creating long-term conditions for more and closer collaboration between the different players in the public transport sector.



There is also a need to fully integrate telematics solutions for data collection. In that work questions will be raised about data ownership, data quality, data integrity and how they will influence and create value in the whole value chain of public transportation. This will be a big and interesting area for future research and implementation.

8. Participating parties and contact person

VOLVO

Volvo Group

Julia Jonasson,
julia.jonasson@volvo.com



Charlie Drab
Charlie.Drab@hlt.se



Bo Enquist
Bo.Enquist@kau.se

Nobina.

Mattias Byström
mattias.bystrom@nobina.se



Maria Wedenby Ahlberg
maria.wedenby@volvo.com

Värmlandstrafik

Lena Thorin
Lena.Thorin@varmlandstrafik.se

9. Appendix I

Safety	<ul style="list-style-type: none">• Trained driver• Driving style• "Black Box"• Alert, safe and sober driver• Health check app for my bus
Access & Comfort	<ul style="list-style-type: none">• Quick optimization of traffic (e.g. every half hour → every 15 minutes)• Call out of bus stops• Individually adapted bus stop call (you get your stop called in time for you)• Information boards at bus stop (real time information)• Travel planner for passengers• Bus stop information in different languages (on board and off board)
Environment	<ul style="list-style-type: none">• Emissions• Energy effective traveling• Progressive payment to operators delivering more than demanded in contract
Passenger & Traffic	<ul style="list-style-type: none">• Connecting traffic, considering the passengers entire travel• Passenger satisfaction• Number of passengers• Market share for public transport Vs. Other modes of transportation• Customer involvement in developing functionalities and services• City planning prioritizing public transport
Time	<ul style="list-style-type: none">• Timeliness, busses on time• Information and swift action at deviations• Frequency, evening and night traffic etc.• Alternative time, allowing the passengers to use their travel productively



Adress: FFI/VINNOVA, 101 58 STOCKHOLM
Besöksadress: VINNOVA, Mäster Samuelsgatan 56, 101 58 STOCKHOLM
Telefon: 08 - 473 30 00