FROM PAPER TO ROAD- AND BACK AGAIN: A COMPARISON OF THE IMPLEMENTATION OF HIGH CAPACITY VEHICLES IN LATIN AMERICAN COUNTRIES

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Abstract

Implementation of innovative freight transport policies face challenges regardless of geography or level of economic development. Financial concerns, social/cultural acceptability and perceived political returns have been identified as key barriers to successful implementation of transport policy, more so than institutional, technical, environmental and legal barriers or needs. This paper describes the successes, failures and current status of the implementation strategies for High Capacity Vehicles (HCV) in selected countries in Latin America. The paper concludes that virtually all implementation strategies for HCVs in the selected countries have encountered challenges where regulatory authorities have been lobbied by stakeholders, both for and against, with varied degrees of success. Implementation of new heavy vehicle technologies could be influenced by the different stakeholders' agendas, regardless of evidence. The authors hope that interested parties in countries in the region and elsewhere will draw lessons from the study, for the future implementation of policies associated with HCVs and other type of new vehicles and technologies.

Keywords: Implementation strategies, legislation, High Capacity Vehicles, innovation, Freight technology, Latin America.

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1. Introduction

Those seeking to implement innovative freight transport policies face challenges and barriers, regardless of geography or level of economic development. A plethora of studies in the Journal of Transport Policy, for example, identify financial concerns, social/cultural acceptability and perceived political returns as key barriers to successful implementation of transport policy, more so than institutional, technical, environmental and legal barriers or needs (Sandberg Hanssen & Jørgensen 2015).

A variety of strategies and business models have been suggested to overcome these barriers, ranging from political science to implementation theories, including Nash equilibrium implementation strategies. In a Nash implementation strategy, the players may have complete or incomplete information, and/or incentives. The implementation challenge is how to design a mechanism (game form) so that the equilibrium outcomes satisfies a criterion of social optimality embodied in a social choice rule (Sandberg Hanssen & Jørgensen 2015). The problem to be solved is "*how to secure the best use of resources known to any of the members of society, for ends whose relative importance only these individuals know*." (Hayek 1948).

This paper describes the challenges, barriers, successes, failures and current status of the implementation strategies for High Capacity Vehicles (HCV) in selected countries in Latin America. The authors hope that countries in the region and elsewhere will draw lessons from the description of the challenges encountered by stakeholders, for the future implementation of HCVs and other type of new vehicles and technologies.

2. Implementation strategies for HCVs

Resolution 197/2010 (MERCOSUR 2010) regulates weights and dimensions for international traffic between MERCOSUR members. Each country member can still determine maximum weights and dimensions for domestic transportation for their national roads (Efron & Corvalan 2012). This paper only refers to challenges of implementing domestic transportation. In most countries in Latin America, domestic road freight accounts for not less than 80% of the total goods movement internally, since the rail and water systems are obsolete or non-existent (Hidalgo 2011).

Implementation strategies used in the Latin-American countries where HCVs circulate or are in the verge of doing so, vary from:

1. Regulating vehicles that are already circulating (e.g. Brazil)
2. Periods of experimentation before final legislation (e.g. province of San Luis Argentina, Uruguay)
3. Final legislation with detailed regulation and implementation procedures, before allowing any HCV to travel The "consensus" style. (e.g. Argentina, Mexico, Colombia).

In Latin America, trade unions and industry associations related to road heavy vehicles transportation can exert a strong influence on policy and legislation. For example, in 2013 Bolivian Roads banned the circulation of the 147 bitrains, rated at 75ton, that were being used for grain transport (Noti Bolivia Rural 2013). In May of that year, the Ministry of Public Works were reviewing and updating the regulation of the General Transport Law number 165 from 2011. According to the Director of the Planning Department of Bolivian Roads, they were working on a weight and dimensions project of law which would help qualify bitrains configurations and the use of super-single tires (La Razón 2013a). The Transport Owners Chamber threatened Bolivian president Evo Morales with a national strike which would have brought the entire country to a halt. The chamber denounced that the use of high technology

heavy vehicles as "disloyal competition" to their members (La Patria 2013). Although the Shippers Association provided technical, legal and economic arguments in support of bitrenes, the Bolivian government decided for prohibition with the commonly used argument that "*bitrains are not safe given their weight and length*". The conflict lasted eight months (La Razón 2013b).

2.1. Regulating "already on the road" unregulated vehicles. The Brazilian example.

In 1998, the National Traffic Council (Contran in Portuguese) published Resolution 68/98 (Conselho Nacional De Trânsito 1998), regulating the use of Cargo Vehicle Combinations (Combinações de Veículos de Carga or CVCs, in Portuguese) with a maximum tonnage of 74 gross weight, and 25 metres (minimum) to 30 metres (maximum) total length. They were defined as vehicles with more than two units, including the tractor unit, with a GWT over 57 ton or total length over 19,80 meters. Table 1 and

Figure 1 provide the desriptions and illustrations of permitted Cargo Vehicle Combinations according to Annex I of the resolution 68/98.

Table 1 Names of the permitted combinations, Annex I, Resolution 68/98 (Conselho Nacional De Trânsito 1998)

Name CVC	*Max Length (meters)*	*GTW (tonne)*	*Number/type of Axles*
Romeo & Juliet	19,80	50 to 57	6 or 7
Bitrem	19,80	57	7 (3 double tandem)
Tritrem	30	74	9 (3 semis of 2 double tandem)
Treminhão	30	63	8 (2 semis of 2 double tandem)
Rodotrem	30	74	9 (2 double tandem and a 2 axle dolly)

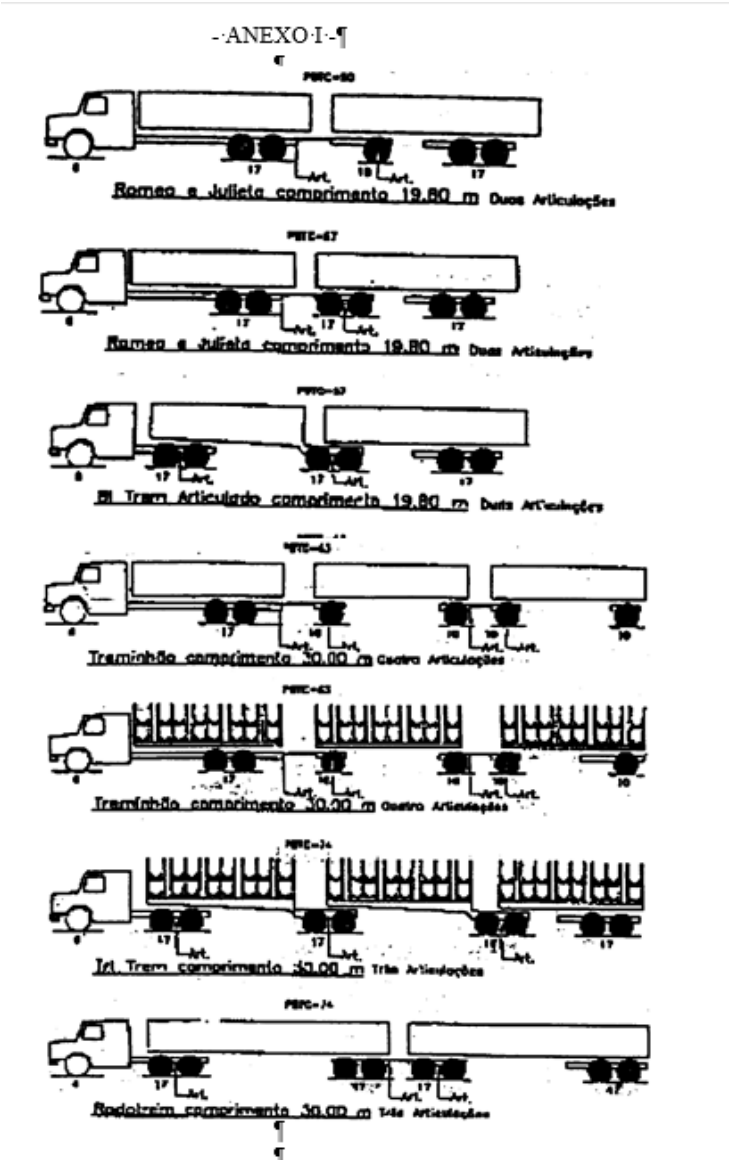


Figure 1 - Illustration of permitted combinations, Annex I, Resolution 68/98 (Conselho Nacional De Trânsito 1998)

These CVCs had to circulate under a Special Authorization Transit Permits (AETs in Portuguese) which was provided by the Roads Executive Authorities. Brazil is a federal state, so these authorities could be state, federal district or municipality.

An AET was valid for one year, for the hours of operation and transit corridors requested, provided a technical audit of the combination was completed by the Roads Authorities of the Union, the States or Municipalities. To renew an AET another technical audit or vehicle inspection signed by the responsible authority's mechanical engineer, where they would declare conformity of the vehicle conditions together with the vehicle owner.

Users however, began to circulate with a new type of vehicle, intermediate to the ones regulated, which they called bitrenzões. These vehicles were as short as bitrains in length (19.8 meters long), but as the Rodotrem in weight (74 tonne GWT with 9 axles) (Caminhões e Carretas 2012).

On the 13th of November 2006, Resolution 211/06 (Conselho Nacional De Trânsito 2006), and later 256/07 (Conselho Nacional De Trânsito 2007), banned the so-called short bitrenzões, indicating 25 meters was the minimum length for 74 tonne GWT, as well as adding the requirement of 6×4 workhorses for CVCs.

Unfortunately, in Article 2 it was indicated that those vehicles circulating before Resolution 211/2006 would have ensured the renewal of their AET, as long as they presented the Certificate of Registration of the combination. Thus, several transport operators transformed older 7 axle, 57 GWT tonnes bitrains into short bitrenzões, gaining 30% in net cargo with little cost.

When complaints were made by road authorities, users of bitrenzões' lawyers held onto Article 7, which says that "*Exceptionally an AET will be granted for Vehicle Combinations CVCs with combined total gross weight of up to 74 tonnes and length of less than 25 meters, provided that the units have been registered by 03 February 2006, and subject to the restrictions imposed by the road authorities*" (Conselho Nacional De Trânsito 2006).

By the end of December 2011, the Department of Roads (Departamento de Estradas de Rodagem DER in Portuguese) of the State of Parana in southern Brazil stopped granting AETs to bitrenzões, which were already banned in the State of São Paulo and Rio Grande do Sul. According to the Traffic Engineering and Road Safety Coordinator, the agency concluded that the vehicle damages roads and works of art. Legally though, the DER still had to provide AETs to those who could prove the bitrenzão was manufactured before Resolution 211/2006 (Caminhões e Carretas 2012).

From all the safety technologies available, only ABS is compulsory on bitrains for those workhorses manufactured after 2013 according to Resolution 380/11 (Conselho Nacional De Trânsito 2011) . Rodotrens with triple axles, which were not defined in Resolution 68/98, are being manufactured and circulate however they are still banned from night travel, despite evidence of them being safer than other vehicles circulating on Brazillian roads.

2.2. Periods of experimentation before final legislation (Provincia San Luis Argentina, Uruguay)

This type of implementation needs a relatively short time to be put in place. For example, in Argentina, the first experimental law allowing the circulation of Heavy Vehicles, named bitrains or B-doubles, was written and signed in the province of San Luis in 2009 (El Senado y la Cámara de Diputados de la Provincia de San Luis 2009). San Luis has a forward looking government, which fosters new transport and logistics technologies with a sustainable vision that "the application of advanced technologies need to benefit the province in a social, economic and environmental way" (Efron & Corvalan 2012). To ensure these benefits, technologies are first examined with the best in the market, several trials are initially performed, and if proved positive then experimentally regulated.

Trials with HCVs in San Luis started in 2008, with the support of Heil Trailers, Scania, and an interested client, Avellaneda Cements. A 25meter length, GTW 75 tonne, and 9 axles with two triple tandems was the vehicle chosen for the trials. A 20 minute video showing the vehicle's characteristics and diverse tests (overtaking, breaking, turning point, traffic calming measures such as speed bumps, bridges) competing against other permitted configurations in the country was produced for promotion (Gobierno de San Luis, Argentina 2008).

The provincial law VIII-0676/2009 and its associated regulations (El Senado y la Cámara de Diputados de la Provincia de San Luis 2009), allowed a three year experiment with B-Doubles. Permits were requested and provided immediately after. The regulation stated compulsory safety technology, not required on the other conventional cargo vehicles at the time, including:

- Minimum power/tonne ratio of 6CV/tn
- ABS in all axles
- Retarder brake
- Pneumatic suspension
- Compatibility certificate between tractor and semitrailers, plus a certificate indicating the vehicle was built to be a b-double

- LED lights, and wide turn advisory lights
- Automatic device to lower the retractile axle when the vehicle is loaded
- Tubeless tires

In Article C of the regulation, a number of provincial roads were specifically allowed for circulation of B-doubles. These roads appeared in the special permit the transport company received from the road authorities, which had to be renewed annually.
Once the experiment proved successful, a definite law was signed in 2012. From the author's conversations with transport operators in San Luis, as of the time of publication, less than 20 bitrains circulate in the provincial roads in San Luis, with no recorded accidents since the experimental law was signed in 2009. In August 2016 a new provincial law was sanctioned and regulated (Agencia de Noticias San Luis 2016), in order to be in line with the National Decree 574/14 which authorizes circulation of B-Doubles nationally, and with shall be explained below.
In Uruguay the president signed Decree 275/11 in October 2011, after six months of a pilot experiment with a 7 axle, 57 tonne bitrain in one specific corridor (Ministerio de Transporte y Obras Públicas 2001). Only a B type coupling was permitted, with a power to weight ratio of 7.3 CV/tn. Safety road technology devices required were specified in the Appendix including:

- ABS
- EBS
- stability control programs
- on-board scale
- pneumatic suspension
- dual tires
- GPS device to allow authorities to register traffic events and speed.

From the authors' conversations with operators and vendors, at the time of publication only one forestry company (UPM) uses eleven bitrains on a single corridor approved. Although Decree 275/11 states that the "*trial showed performance of proved higher than existing vehicles and less damaging of the pavement*", no other corridor has been requested by other companies.

2.3. Final legislation with detailed regulation and implementation procedures, before allowing any HCV to travel The "consensus" style. (e.g. Argentina, Mexico, Colombia).

Consensus, as may be imagined, requires longer periods of time both to publish the legislation and associated regulations, and to implement and put in place controlling authorities. Consensus is highly dependent on the "political moment", and the political strength of the different stakeholders involved in the writing and/or implementation of the legislation, and the ones which want to maintain the status quo.
Therefore, celebrating the publication of HCV legislation could prove naïve and premature. In Argentina for example, once published, a law/decree needs to be regulated in less than 2 years or loses its "parliamentary status", becoming obsolete. If this hurdle of regulation is overcome, then comes the implementation of the regulation, requiring more consensus. The following three examples show three stages of the consensus style. Mexico, where HCVs circulate since 2008. Argentina, in the stage of implementation of a presidential decree from 2014, and Colombia, which is finalizing the writing of legislation.

Mexico
NOM-012-SCT-2-2008 regulating maximum of weights, dimensions and circulation requirements for road transport was published in Mexico (Secretaria de Comunicaciones y Transportes 2008). This legislation included for the first time HCVs, locally called "*fulles*".

The consultation for regulation started officially in November 2006, after the project for creating the norm PROY-NOM-012-SCT-2-2003 was approved in March 2003 (Secretaria de Comunicaciones y Transportes 2008). In 2008, a fifty-page document, where approximately 60 organizations - federal and state authorities, universities, associations and private companies- had their input, was published online. The document is very detailed in the description, depiction and coding of the different types of vehicles allowed, both passengers and freight, and in which particular roads they can circulate. A full glossary of terms is at the beginning of the document, so that definitions are interpreted equally by all stakeholders.

Examples of level of detail in NOM-012-SCT-2-2008
Table 2 shows the coding for tractor (T), semitrailers (S) and trailers (R). and depiction of its configurations, as number of axles and tires. Numbers besides the letters refer to the number of axles.

Table 2 - Coding for tractors, semitrailers and trailers, page 15/50 NOM-012-SCT-2-2008 (Secretaria de Comunicaciones y Transportes 2008)

TRACTOCAMION SEMIRREMOLQUE-REMOLQUE (T-S-R)			
NOMENCLATURA	NÚMERO DE EJES	NÚMERO DE LLANTAS	CONFIGURACIÓN DEL VEHÍCULO
T2-S1-R2	5	18	
T2-S2-R2	6	22	
T2-S1-R3	6	22	
T3-S1-R2	6	22	
T3-S1-R3	7	26	
T3-S2-R2(1)	7	26	
T3-S2-R3	8	30	
T3-S2-R4(1)	9	34	
T2-S2-S2	6	22	
T3-S2-S2	7	26	
T3-S3-S2	8	30	

Table 3 shows requirements of minimum power ratio, torque, axle traction and break technologies for the different types of vehicles, besides requiring the low emissions certificate.

Table 3 - Requirements of minimum power ratio, torque, axle traction and break technologies by vehicle configuration, page 18/50 NOM-012-SCT-2-2008 (Secretaria de Comunicaciones y Transportes 2008)

VEHÍCULO O CONFIGURACIÓN VEHICULAR	NÚM. EJES	NÚM. LLANTAS	PESO BRUTO VEHICULAR (t)			
			ET y A	B	C	D
B2	2	6	17,5	16,5	14,5	13,0
B3	3	8	21,5	19,0	17,0	16,0
B3	3	10	24,5	23,0	20,0	18,5
B4	4	10	27,0	25,0	22,5	21,0
C2	2	6	17,5	16,5	14,5	13,0
C3	3	8	21,5	19,0	17,0	16,0
C3	3	10	24,5	23,0	20,0	18,5
C2-R2	4	14	37,5	35,5	NA	NA
C3-R2	5	18	44,5	42,0	NA	NA
C3-R3	6	22	51,5	47,5	NA	NA
C2-R3	5	18	44,5	41,0	NA	NA
T2-S1	3	10	27,5	26,0	22,5	NA
T2-S2	4	14	34,5	31,5	28,0	NA
T3-S2	5	18	41,5	38,0	33,5	NA
T3-S3	6	22	48,0	45,5	40,0	NA
T2-S3	5	18	41,0	39,0	34,5	NA
T3-S1	4	14	34,5	32,5	28,0	NA
T2-S1-R2	5	18	47,5	45,0	NA	NA
T2-S1-R3	6	22	54,5	50,5	NA	NA
T2-S2-R2	6	22	54,5	50,5	NA	NA
T3-S1-R2	6	22	54,5	51,5	NA	NA
T3-S1-R3	7	26	60,5	57,5	NA	NA
T3-S2-R2	7	26	60,5	57,5	NA	NA
T3-S2-R4	9	34	66,5	66,0	NA	NA
T3-S2-R3	8	30	63,0	62,5	NA	NA
T3-S3-S2	8	30	60,0	60,0	NA	NA
T2-S2-S2	6	22	51,5	46,5	NA	NA
T3-S2-S2	7	26	58,5	53,0	NA	NA

Table 4 shows GTW per type of vehicle and type of road. From left to right, the first column is the vehicle configuration coding, next the number of axles, followed by the number of tires and last four columns the allowed maximum weight in tonnes per type of road (ET and A, B, C or D. It has to be noted that, while the maximum GVW is stated in tonnes, power ratio, torque and axle traction are stated in pounds per feet, in sync with the North American figures.

Table 4 - GTW per type of vehicle and type of road, page 35/50 NOM-012-SCT-2-2008 (Secretaria de Comunicaciones y Transportes 2008)

(1) VEHÍCULO O CONFIGURACIÓN VEHICULAR	CONTAR CON DICTAMEN DE CONDICIONES FÍSICO MECÁNICAS Y DE BAJA EMISIÓN DE CONTAMINANTES VIGENTES (T, S y R)	MOTOR ELECTRÓNICO HP MÍNIMO (T)	TORQUE MÍNIMO (T) (lb-pie)	CAPACIDAD MÍNIMA DE LOS EJES DE TRACCIÓN (T) (lb)	FRENO AUXILIAR DE MOTOR O RETARDADOR O FRENO LIBRE DE FRICCIÓN (T)	CONVERTIDOR EQUIPADO CON DOBLE CADENA DE SEGURIDAD	SISTEMA ANTIBLOQUEO PARA FRENOS (T, S y R)	SUSPENSIÓN DE AIRE (EXCEPTO EJE DIRECCIONAL-DELANTERO) (T, S y R)
T2-S1	✓	260	660	-	✓	-	✓	✓
T2-S2	✓	300	800	-	✓	-	✓	✓
T3-S2	✓	350	1 050	-	✓	-	✓	✓
T3-S3	✓	350	1 050	-	✓	-	✓	✓
T2-S3	✓	350	1 050	-	✓	-	✓	✓
T3-S1	✓	300	800	-	✓	-	✓	✓
T2-S1-R2	✓	350	1 250	30 000	✓	✓	✓	✓
T2-S2-R2	✓	350	1 250	30 000	✓	✓	✓	✓
T2-S1-R3	✓	370	1 250	30 000	✓	✓	✓	✓
T3-S1-R2	✓	370	1 250	40 000	✓	✓	✓	✓
T3-S1-R3	✓	400	1 650	44 000	✓	✓	✓	✓
T3-S2-R2	✓	400	1 650	44 000	✓	✓	✓	✓
T3-S2-R4	✓	450	1 850	46 000	✓	✓	✓	✓
T3-S2-R3	✓	450	1 850	44 000	✓	✓	✓	✓
T3-S3-S2	✓	400	1 650	44 000	✓	-	✓	✓
T2-S2-S2	✓	370	1 250	30 000	✓	-	✓	✓
T3-S2-S2	✓	400	1 650	44 000	✓	-	✓	✓

From the authors' experience, smaller transport owners opposed strongly to the use of *fulles* in Mexico, mainly arguing that shippers would pay the same cost per ton regardless of type of vehicle configuration. The *fulles* cost per tonne had become the market reference, lowering the rates paid to all vehicle operators.

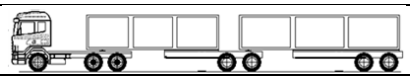
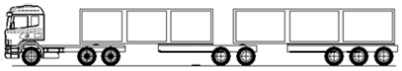
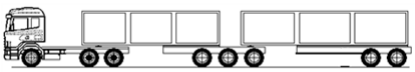
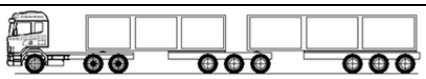
NOM-012-SCT-2-2008 increased the maximum GVW of HCVs to 80 tonnes for the T3-S2-R4, with a 4.5tonne extra allowed by law, and maximum length of 31 meters.

Arguments for and against continued, until on the 7th of May 2013, a T3-S2-R4 carrying gas had an accident on a motorway, when the second trailer broke off, crossed lanes and exploded, causing the death of 26 people. As expected, public reaction to the accident was strong with some journalists and politicians requesting the immediate ban on *fulles*, regardless of the evidence from the Secretariat for Communications and Transport showing that from the 40 thousand vehicles involved in accidents in Mexico per year, only 2.4% corresponded to HCVs, with 0.5% of the deaths 0.3% injured, while 57.2% of total accidents and 57.9% of deaths corresponded to cars (Máynez Gil 2013).
After the accident authorities called for a special committee with a panel of international experts to study the future of HCVs in Mexico. Initially, and while waiting for the committee´s report, the Secretariat for Communications and Transport imposed more restrictions to the circulation of *fulles* (Quadratín Michoacán 2015).
In January 2015 a new Norm on weights and dimensions came into force (Secretaria de Comunicaciones y Transportes 2014). It was requested that the *fulles* would have safety technology such as GPS, ABS, auxiliary engine break or retarder or break free of friction. Additionally, maximum speed allowed would be of 80 Km/h, and drivers should have experience and capabilities to operate them. The 4.5t extra was initially suspended and later on eliminated altogether, leaving maximum GVW to 75tonne.

Argentina:
After the success of HCVs implementation in San Luis, other provinces sought to draft their own laws regarding high capacity vehicles, however assorted provincial legislation would only have brought confusion to the transport operators who cross provincial borders. Therefore, in the name of standardization and operational straightforwardness, stakeholders were convinced of the need for a national legislation, that provinces could adhere to later. A pro-bitrain group was formed by a number of people from private companies, many of them competitors among themselves, to foster the idea of a national legislation to authorize HCVs.
In November 2012 the first draft of the idea was presented to the National Secretary of Industry, and a promise of review was given. The pro-bitrain group as well as the government of the province of San Luis, continued to disseminate the concept, participating in events, public and private talks, inviting Australian engineer Bob Pearson, well known internationally for his theoretical and practical knowledge on HCVs implementation, to provide advice. Bob participated in approximately eight talks in four different provinces. In many of these events, stakeholders who were against the idea of HCVs questioned their use and authorization, with arguments such as "*they are too heavy, it shall destroy the little infrastructure we have*", "*we do not have infrastructure, we need more motorways*", "*how will authorities control overweight, proper use of corridors, speeding*". When explained that heavy vehicle technology devices would be used, such as on-board scales, GPS, ABS and ESP, speed control, among others, the powerful emotional argument of "*rich multinationals and large companies will kill the poor small truck companies*" was used.
In July 2013, the Governor of one province, who was working very closely with the national president, attended an event organized by a provincial semitrailer manufacturer. Realizing its logistics potential for regional economies, he took the idea to discuss it with the president. Within a few months, legislation was drafted, with an experimental trip of 400km with a 75tonne 25 meter length leaving in November. However, the president suffered a serious health problem just before the experiment, and the pilot was indefinitely suspended.
Surprisingly, on the 24th of April 2014, a National Presidential Decree allowing circulation of bitrains nationally was signed and published in the Official Bulletin (Poder Ejecutivo Nacional 2014). The signature of Decree 574/14 was made in a large public event, and televised. Voices for and against were heard and read, the former technically correct, the latter emotionally louder.

In Argentina, legislation is null unless it is officially regulated within two years of the law/decree being signed. The Sub-secretary of Road Transport, and the Head of the National Commission of Road Transport Safety were appointed to lead the consultations with public and private organizations who could have a say in the regulation of the legislation. Consultations and lobbying took approximately six months, however once ready and signed, the national government was looking for the right "political moment" to publish the regulations. In a presidential election year, that proved difficult to find.
At the beginning of October 2015, 18 months after Decree 574/14 was announced, and just two weeks before presidential elections, regulations were published officially. This time though, in a discreet manner and leaving the challenges of implementing the legislation in the hands of the future government, whichever political color it may be.
Regulation of Decree 574/14 was divided into two Dispositions and one Resolution. Disposition SSTA918/15, from the Ministry of Interior and Transport, regards all approved procedures and forms for HCVs circulation. Its nine articles only describe the subject of the procedures and forms, each article sending the interested party to an Appendix number where all requirements are described in more detail. Articles refer to the vehicles, corridors and driver training. Disposition SSTA2/2015 and Resolution SI1132/2015, are a joint document from the Ministry of Interior and Transport and Ministry of Industry, indicating the approval of the Passive and Active Safety requirements the HCVs should have, again sending the interested party to an Appendix where requirements are detailed.
The idea behind the articles and appendices was to shorten the time and consultation needs for modifying them on behalf of operational, manufacturing needs and technological advancements.
Table 5 shows the four types of configuration in the regulation of Decree 574/14, and their coding, where S means "single tire" and D "double tires", and the numbers 1-2-3 the numbers of axles per tandem, indicating the only single axle single tire allowed it the front tractor ones.

Table 5 - Allowable configurations, Regulations of Decree 574/14

Configuration	**General Outline**	**Weight per Axles** (t)	**GTW.** (t)
1S2D2D2D		6+18+18+18	60,0
1S2D2D3D		6+18+18+25,5	67,5
1S2D3D2D		6+18+25,5+18	67,5
1S2D3D3D		6+18+25,5+25,5	75,0

By definition, bitrains in Argentina are coupled by a B-coupling. Minimum power to tonne ratio is 6.75CV/tonne, the vehicle needs to be built to purpose, have a "Compatibility Certificate" showing the three elements of the bitrain are interchangeable. Heavy vehicle technology devices are compulsory, such as on-board scales, GPS, ABS, ESB, and ESP, speed control, retractable axle automatic control, LED lights, pneumatic suspension and many more described in Disposition SSTA2/2015 and Resolution SI1132/2015.
National, provincial and municipal elections took place. The presidency was won by another political party, and all new governments started on December 10th, just before the beginning of summer holidays. For the first time in its history, a National Transport Ministry was created. All new authorities had to be appointed and its appointments published, for the authorities to

be legally responsible. The National Roads Agency, which always held its autarky, was brought to under the Transport Ministry´s sphere. All these changes took approximately four months.
Implementation of the published regulations is proving hard and lengthy. For a company to have a HCV circulating legally on Argentine roads, it needs to have three authorized elements: vehicle (both tractor and semitrailers), corridor and driver. The vehicle is authorized by the National Institute of Industrial Technology (INTI in Spanish), which depends of the Ministry of Production. Authorised corridors and drivers are a matter of the Transport Ministry. There are currently more than 60 corridors requests, awaiting a response. More than ten local manufacturers, mostly from regional small towns, are ready to build vehicles. Provincial governors have publicly shown their interest, in events and talks that continue to be held, promoted by the pro-bitrain group. Numberless meetings have been held at high levels, where politicians realize the scale of local investment and jobs allowing the manufacturing and circulation of HCVs could mean. National authorities are finally studying the holding a "pilot experiment", with four to ten corridors where one bitrain could circulate in each. In the meantime, four new types of vehicles similar to the Brazilian bitrenzões, have been proposed by the Federation of Transport Companies, to increase GTW by the addition of one axle, but with no heavy vehicle technology involved. The coming months will tell if HCVs are given green light to travel.

3. Conclusions

Virtually all implementation strategies for HCVs have encountered challenges where regulatory authorities have been lobbied by stakeholders, both for and against, with varied degrees of success. Stakeholders in favour of HCVs often base their arguments on advancing safety technologies, the strengthening of the domestic market, enhancing competitiveness in the world market and reduced road deterioration. Stakeholders' arguments against HCV authorization usually highlight emotional arguments, emphasising unfair competition with smaller fleet operators (MSMEs or *MiPyMEs*) who would not have the capability of purchasing an HCV, would see their rate per ton transported across the market reduced and therefore would lose their means to make a living. The myths of "*unsafe because of lengthier and heavier*", "*bridges are not built for that weight*" and "*only suitable for motorways*" are widely used regardless of the overwhelming weight of evidence showing that reality is exactly the opposite. When these arguments do not work, there is always the possibility of organized direct actions, which are feared by authorities.
Similarly, the implementation of new vehicles and technologies could be influenced by the different stakeholders' agendas, regardless of how rigorously sound or damaging those new vehicles or technologies could be. For example, in July 2016 an article was written by a delegate of the Mexican Alliance of Transport Organizations (Amotac) opposing potential platooning in Mexico, after the successful trials in Europe occurred. Although explaining that the new technologies will make trucks more efficient and safe, and that the driver will start having a supervisory role, allowing him to work more comfortably and safer, the article predicts strong opposition to the platooning and other autonomous and semiautonomous systems because of the millions of jobs that will be lost when "*opening the door to a technological reconversion of unprecedented consequences*".
The authorities' challenge is to find the appropriate balance between the two types of arguments, in a fast changing political environment, strong unions and associations' lobbying, without losing the vision towards the future of road transport in their own countries and regions as a whole.

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