

交通运输解决方案和互联： 推动一带一路的繁荣发展

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摘要

“一带一路”（OBOR）倡议是由中华人民共和国在 2013 年提出的一个发展战略和框架，它的政策优先领域在于推动国家间的互联互通与合作。

交通运输对于促进货物和人员的流动是必不可少的，并在各个国家和地区的社会和经济发展中发挥着显著的作用。交通运输的互联互通程度越高，则交通网络中的每一个用户的受益就会越多。区域基础设施的发展为所有的参与国创造了一个双赢的结果，提高该地区交通的互联互通将会扩大市场准入、降低贸易成本并推动更高效的能源生产和使用，从而给亚洲带来更大的福利收益。

在本文中，沃尔沃集团分析了该地区面临的机遇和挑战，同时收集了交通运输解决方案和基础设施建设领域的案例。还为中国提出了以下政策建议：

- **可持续发展需要持续的投资。**要充分利用跨国公司的优势并挖掘潜力，关键需要为“一带一路”提供持续的政府主导的投资，保持可持续交通运输互联互通的发展势头，并为项目引入新的融资模式，从而为跨国公司更积极地参与一带一路计划创造动力。
- **建立公平的竞争环境。**所有的商业合作伙伴，包括中国国有企业，中小型企业或跨国公司，都应该获得平等的地位，这样才能鼓励他们形成跨地域和跨行业的合作伙伴协作体，并充分发挥各自的比较优势。

- **政策协调十分必要。**为了改善交通的互联互通，应考虑建立一个跨区域协调的政治和政策环境，尤其是对交通运输政策的协调和车辆一致性认证等方面提供便利。
- **应兼顾全方位考虑。**为了推动实现一带一路的愿景，交通运输解决方案和互联将成为重要的铺路石。创新驱动是可持续发展的关键，应该始终采取全面的方法，平衡解决经济、环境和社会的多维度的问题。

一、介绍

随着亚洲的持续崛起以及对全球经济的影响力日益增加，区域一体化的趋势正在不断加速，这既带来了收益同时也伴随着代价。随着商品和服务市场的扩大（产出和投入），可以预期这将创造较高的经济增长和福利的改善。根据比较优势的原则，一体化有助于在整个地区（或全球）内更有效地配置资源。“一带一路”倡议是由中国在 2013 年首先提出的，该倡议也是建立对参与各方均有利的区域合作框架的推动力之一。由于区域发展的复杂性和程度，单独的参与者无法解决所有相关问题。本文的目的在于提出以知识为基础的关于区域一体化和共同繁荣的政策建议，尤其是关于“一带一路”倡议有关的内容。因此，报告范围仅限于沃尔沃集团的专业领域——也就是交通运输解决方案和互联互通。

交通运输是经济发展的基础，也是实现高品质社会生活的关键。任何追求经济和社会可持续发展的国家都必须将交通运输的政策制定摆在政治任务的首要地位。本文不仅包含大量的科技实例，同时也为中国提出了一些政策建议。

沃尔沃集团是全球领先的卡车、客车、建筑设备和船用/工业用发动机的生产企业。集团还提供包括金融和服务在内的全套解决方案。通过开发和提供不同品牌的产品和服务，沃尔沃集团可以满足成熟以及新兴市场中许多不同的客户的诉求。沃尔沃集团全球雇员约 10 万人，在超过 19 个国家和地区从事研发制造，产品涵盖了 190 多个市场。沃尔沃集团的使命为：**“通过交通运输解决方案来推动繁荣”**，同时秉持**“客户成功、热情、信赖、改变和表现”**的企业价值观，推动履行这一使命。

1992 年，沃尔沃集团在中国设立了第一个办事处。目前，集团各业务领域均已成功地进入了国内，合并业务覆盖了 22 个省、市、自治区，拥有大约 6000 名员工。继沃尔沃位于瑞典的全球总部之后，中国已成为第二个“本土市场”。

二、关于一带一路倡议

1. 基本事实

亚洲开发银行的研究报告估计，2010 年到 2020 年之间，亚洲基础设施上投资缺口约8万亿美元，在具体的区域基础设施项目上投入约2900亿美元。为了充分挖掘其经济潜力，亚洲正面临着建设区域基础设施，为整个地区和世界其它地方提供高效和无缝互联互通的挑战。

2013 年，中国国家主席习近平在访问中亚和东南亚期间，提出了建立陆上“丝绸之路经济带”和“二十一世纪海上丝绸之路”的概念。“丝绸之路经济带”上有 47 个国家，“21 世纪海上丝绸之路”沿途有 33 个国家，总共覆盖 40 亿人口（占世界人口的约 63%），GDP 总量 20 万亿美元（占世界总量的 29%）。这两条路线后来简称为“一带一路”（OBOR）倡议，将形成一个连接三大洲的巨环，在陆地和海上“经济走廊”上将中国与东南亚、亚太、中东、欧洲和北非连接起来。

2015 年 3 月 28 日，中国政府发布了题为“*共建一带一路的愿景与行动*”的正式文件，详细介绍了设想过程的各个方面，涉及经济、金融、文化和安全。根据这一文件，基础设施的互联互通将成为“一带一路”的优先领域，加快投资和商业合作将是倡议的重要内容，而资本的高效流动则是基础支柱。

2. 近期的发展

随着“愿景与行动”的发布，“一带一路”的部署正在加速。各中央部委，包括国家发展和改革委员会、商务部和交通运输部，先后出台了配套的计划和措施。此外，截止2015年10月，中国的34个省、市、自治区已制定完成各自的一带一路具体实施方案。其中，“长江经济带”、“中国中部崛起”和“京津冀一体化”作为国内区域一体化战略支持中国的进一步发展。毫无疑问，通过实施一带一路战略来促进区域全面发展成为了中央政府的重要议事议程，并保持了良好的发展势头。

此外，为完善一带一路倡议的金融支持，推动愿景的实现，一带一路得到了雄厚的金融机构和合作机制作为其“现金池”的有力支持，即丝路基金（SRF）和亚洲基础设施投资银行（AIIB）。

400 亿美元丝路基金得到中国投资有限责任公司（中国的主权财富基

金）、中国国家开发银行、中国进出口银行和国家外汇管理局的共同支持，于2015年2月设立，目标就是给一带一路提供直接的支持。它的任务是通过给基础设施（铁路、公路、港口和机场）、资源、产业和金融合作项目融资，改善一带一路沿线国家和地区间的互联互通状况。

同时，亚洲基础设施投资银行（由中国在2013年10月发起）于2015年12月25日在北京正式成立，有57个创始成员。瑞典政府于2015年3月31日申请加入亚投行，同年4月15日被批准为创始成员国。AIIB的初始资金为1000亿美元，旨在帮助一带一路的建设融资。亚投行的目标是将中国建设基础设施的核心竞争力与财政支持结合起来，帮助亚洲其它国家和地区发展交通、电信、能源和电力、城市建设与物流、农村基础设施和环保领域。

3. 对外投资作为铺路石

根据中国国家统计局和商务部的统计，2005年至2015年间，中国的对外直接投资（FDI）增长了8倍。随着资金和技术实力的增强，越来越多的中国企业正在寻求利用全球资源，在全球范围内建立发展优势。对外投资已成为企业获得生产要素、提高创新能力和核心竞争力的一项重要手段，从而推动其产业链向上游延伸。中国的强劲对外投资为实现这一庞大的倡议愿景奠定了坚实的基础。

虽然一带一路倡议目前仍处在发展初期，但考虑到一带一路尤其关注基础设施的互联互通，交通运输行业将有广阔的发展前景，因此，相关企业应及时制定相应的计划并采取行动，才能抓住这一机会。

三、交通运输解决方案和互联互通是推动地区繁荣的关键因素

1. 交通基础设施投资全球展望

交通运输和物流业构成了现代全球供应链的中坚力量。运输物流业包括货运、仓储、清关、支付系统以及日益增加的生产商、商户及服务商的外包业务。在世界范围内，运输物流公司的表现差异很大。其中一个主要原因就在于基础设施的条件，这是运输和物流得以高效运行的基础。世界银行物流表现指数显示，国家之间物流效率表现所存在的广泛差异很难解决，因为每

个国家都有自己的挑战，并且没有单一的解决方案。因此，为交通基础设施投资设计战略计划时，表现考虑每个国家的特殊情况。

从全球的角度来看，根据普华永道“*评估全球运输基础设施市场：2025年展望*”报告显示，2014年至2025年期间，全球交通基础设施投资预计以5%左右的年均增长率增加。按地区划分情况如下，

亚太地区仍将是全球最大的交通基础设施建设市场。**这是**由于全球经济发展重心从西半球转向东半球以及亚洲财富积聚和城市化进程加速的结果。亚太地区投资额将从每年的5570亿美元增加到2025年的每年近9000亿美元。该地区的许多经济体将继续推动交通网络的大规模发展。预计在公路基础设施有重大投资以容纳更多的汽车，同时为缓解城市交通拥堵，公共交通基础设施的投资也将加速。为了扩大国际贸易，预计港口基础设施也将有强劲的增长。

关于**东欧**，大部分国家目前对运输的基础设施投资比例小于全球平均水平，但估计这一趋势将会有所改变。由于东欧国家需将采掘业的产品出口至其它市场，所以交通货物网络的投资将保持稳定增长。预计2014年到2025年，港口的建设投入每年将增长近10%。

中东和拉丁美洲，道路运输仍然是交通的最大的组成部分。未来十年，财富水平的不断增长将带动汽车保有量的强劲增长。因此，这两个地区的道路投资在此期间预计将分别大幅增加近116%，到2025年将达到每年310亿美元，年均增长11%。

对于**非洲**，撒哈拉以南的非洲地区是增长最快的区域基础设施市场，预计从2015到2025年，运输建设支出年均增长将超过11%。大部分的增长预计将投入到道路和港口的建设。

相比之下，**美国、加拿大和西欧**在交通基础设施投资将呈现适度增长态势，这源于许多先进国家的交通网络已经很发达，同时政府面临持续的财政紧缩。

2. 交通互联互通的范围和分类

鉴于交通基础设施的投资前景看好，而亚太地区各国之间交通基础设施

的发展水平不同。运输物流业对基础设施有着高度依赖，为促进区域发展，必须要通过交通的互联互通来填补缺失的关键环节，来连接该地区各国。

互联互通是指被连接或相连的状态、质量和能力。从更广泛的意义上，交通的互联互通可包括以下五个主要方面：

基础设施的互联互通。桥梁、港口、机场、火车站等交通基础设施都应该通过陆路、海路或航线，以最有效的方式无缝连接起来。

物流和供应链互联互通。出口在新市场的表现不尽相同，而区域内供应链的零部件占贸易总额的份额越来越大。这些趋势表明了需要高效灵活的物流网络，为不同的运输方式之间提供更为便捷的连接，从而使贸易能够用更短的时间、更低的交易成本达到更多的目的地。

城市和城际间交通。在人口稠密和严重拥堵的城市，公共交通应发挥主导作用，以确保居民的自由流动。

交通数据的互联互通。随着近年来技术的进步，运输数据的生成、处理和存储的数量和速度都是前所未有的。完善的数据互联互通可以保证货物和人员更为安全高效的流动，在极端情况下，可防止或妥善应对可能出现的威胁，包括自然和人为的威胁。

交通政策的互联互通。应通过交通运输政策的相互协调，推动车辆一致性以及基础设施的标准和法规的逐步统一。

交通互联互通对于促进货物和人员的流动是必不可少的，并在各个国家和地区的社会和经济发展中发挥着显著的作用。亚洲开发银行的研究发现，改善亚太地区的交通互联的好处是巨大的，而且该地区的所有国家都将受益。此外，交通运输的互联互通越完善，交通网络所涉及的相关方的受益就会越多。区域基础设施发展为所有参与国创造了一个双赢的结果。改善该地区交通的互联互通状况，同时也能扩大市场准入、降低贸易成本，并推动更高效的能源生产和使用，给亚洲地区带来更大的福祉。

3. 一带一路带来的重大商机

根据商务部发布的消息，2015年1月至7月，中国政府已经发起了超过1400个与“一带一路”相关的承包项目，涉及高铁、电力改造、港口新建和

扩建。与此同时，中国企业在一带一路沿线的 48 个国家的对外直接投资达 85.9 亿美元，比上年同期增长 29.5%。此外，中国公司与参与一带一路的 60 个国家签订了 1786 份合同，价值 494 亿美元，比上年同期增长 44.9%。

“一带一路”的快速发展将带来重大的商业机会。举例来说，在短期内，基建项目（无论是进行中还是审批中）都带动了对工程机械设备的需求。而从长远来看，贸易流将提高一带一路沿线有效地运输货物和人员的能力，这使得长途货物运输和城市交通显得尤为重要。此外，交通网络在一带一路的环境下变得更加复杂和拥挤，多式联运将被经常使用，因为不同的交通方式各有优缺点，因而交通数据交换和利用在改善一带一路沿线国家的交通互联互通方面变得更为重要。

4. 区域内的主要挑战和障碍

鉴于涉及的国家众多且资金投入很大，对区域内的挑战和障碍采取适当的评估是十分必要的，希望参与“一带一路”建设的企业可以为自己的业务在这些新市场所面临的潜在威胁做好相应准备。

- **地缘政治和安全**

最突出的挑战是“一带一路”沿线的某些国家常年受到武装冲突的困扰，例如，阿富汗和伊拉克。此外，与私人资本所从事的国外直接投资不同，一带一路项目的政治风险可能更大，因为许多一带一路项目往往是比较大型的建设项目，这意味着只有目的地国家政府的大力参与，才能完成项目实施。因此，需要充分考虑到一些国家的安全局势和不稳定因素。

- **企业经营风险**

由于部分一带一路项目将由丝路基金或亚投行来资助，必须充分考虑到可能无力偿还贷款的情况。严格评估公司将经营的所在国家的信用风险也是必要的。除此之外，在评估经营风险的过程中，还应该认真分析其它因素，包括政府效率、法律和监管环境、宏观经济风险、外贸和支付问题、劳动力市场、金融风险、税收政策、当地基础设施的标准。

- **“硬”和“软”基础设施不足**

在一带一路国家中，大部分是发展中国家。由于处于欠发达状态，必要的桥梁、港口、机场、火车站等辅助交通运输基础设施将无法得到保证，更不用说多元化的运输方式和高效的运输产品了。对于那些相对较先进的国家，道路拥堵成为一个日益严重的问题。找到交通运输解决方案，以减少城市的拥堵的有很大的压力。而在许多大城市，交通运输基础设施的重大升级对于让城市有效运行是至关重要的。

同时，由于经济和社会发展的水平相对较低，大多数一带一路的国家信息和通信技术行业有待发展，同时也面临着熟练工人的短缺和交通运输部门的管理能力不足。

- **跨境贸易的交通运输政策不协调**

另一个主要挑战是相关国家间的交通运输政策不协调。因为各国位于不同的地区，有各自不同的历史背景，这使得交通运输标准的一致性工作非常困难。由于一带一路涉及到由公路相连的多个邻国，该地区的交通运输互联互通所面临的另一个障碍是，如何通过更协调的交通运输政策，通过每一个国家交通管理部门之间的联合协作，加快跨境贸易流动。

改善区域交通互联互通涉及到如何更有效地利用过境检查点。通常，这些检查点对货物和人员的畅通通行造成一定影响。运输业务的顺畅程度变量很多，取决于边境的位置和相邻国家间的合作、车辆重量和车廓尺寸标注，现有的运输协议，来源地和目的地以及货物的类型。清关过程也根据运输路线而有所不同。一些常见的非物理性的障碍有：过境手续和程序的不一致、过度收费及时限过长；限制车辆进入；在边境需要转运；车辆和司机的标准不同；签证要求的限制；过境运输操作流程的不统一；各个边境检查站的工作时间不一致；各利益相关者之间的协调；非必要的安全检查。

四、沃尔沃集团的解决方案和区域发展之间的协同作用

当前全球面临的诸多挑战都与基础设施、交通运输业直接或者间接相关。它们包括气候变化、人口增长、城市化以及自然资源和原材料短缺。为了应对紧迫的全球性挑战，为经济、社会和环境的发展做出积极的贡献，需要更有效，更可持续地进行交通运输。

由于沃尔沃集团的产品和服务在运送人员和货物，建设道路和基础设施方面发挥了重要作用，沃尔沃集团致力于积极参与，寻找、开发和提供运输解决方案，以改善短期和长期的经济和环境效益，同时在任何时候都考虑到社会影响。我们把自己看作一个很好的商业合作伙伴，作为一带一路计划的一部分，促进区域协调发展。

- **基础设施和城市公用事业**

与中国相比较，一带一路沿线的大多数国家都在基础设施建设方面不如中国发达。因此，交通的互联互通是“一带一路”的优先领域，而基础设施的发展是正是打破这个瓶颈所急需的第一步。加大基础设施投资计划无疑将有利于中国的工程机械制造商、基础设施建设企业、建材生产企业以及基础设施运营商开拓海外市场。由于在中国有着良好的业务和一流的声誉，沃尔沃建筑设备公司及其合资伙伴山东临工将很好的与其业务合作伙伴一起，共享一带一路提供的机会。而中国正是推动项目的主要动力。沃尔沃建筑设备和山东临工是中国所有重要的挖掘机和轮式装载机细分市场的市场领导者，能为基础设施建设提供全方位的综合产品和服务。通过沃尔沃建筑设备公司的Terex卡车品牌，公司还是中国领先的铰接式卡车制造商。

沃尔沃建筑设备公司的发展可以追溯到180年前，它也是成立时间最久的全球建筑设备行业的生产商，为建筑、挖掘、废物处理、林业和物料搬运部门提供产品及服务。公司的产品（挖掘机、轮式装载机和铰卡，以及筑路机械，如摊铺机和压路机）已被用于全世界的重大基建项目。这些项目包括港口建设（阿曼塞拉莱），土地复垦（阿联酋迪拜）和机场（新加坡樟宜），以及中国和蒙古之间最大的5年铁路建设项目，总长1837公里。此外产品还被广泛运用在高速公路建设方面（如波兰的A2项目，巴基斯坦的达苏水电站）。沃尔沃建筑设备还在维护设备正常运转时间、燃油效率和提高生产力等方面提供全方位的服务。公司通过125多个沃尔沃自有和独立的经销商组成的全球网络，销售产品和提供服务支持。

沃尔沃通过其三大品牌，在中国树立了良好形象，并在临沂和上海建立了主要生产基地，在济南设立研发和设计机构，在上海设有销售办事处。公司近年来还为中国基础设施的快速发展作出了突出的贡献。2010年，一支使

用沃尔沃品牌筑路机械设备的工程车队帮助翻新北京著名的10车道宽的长安街（穿过天安门广场）。沃尔沃摊铺机也被用来翻新中国第一条沙漠高速公路的路面——从不毛之地延伸134多公里直至内蒙古自治区的边界。

在沃尔沃集团内部，沃尔沃建筑设备公司将自己视为为“一带一路”倡议带来生机和活力的合作伙伴。

- **物流与运输**

物流对该地区的发展至关重要。一带一路的目标是通过消除不必要的贸易壁垒，将参与供应链的所有企业连接起来，并使交易过程变得更短、更便捷。有了必要的互联和网络，一带一路将加快货物的流动，鼓励企业在亚洲地区开展跨国业务。蓬勃发展的跨境贸易和工程项目最终将为消费品的地面运输和特种设备创造强大的业务需求。考虑到沃尔沃卡车公司在该地区强大的业务存在，它可以在新兴的长途运输业务中发挥至关重要的作用，并为区域间的贸易提供更加高效的运输解决方案。

作为中国最大的商用车制造商之一，东风商用车（沃尔沃集团与东风集团的合资企业）拥有齐全的重型和中型卡车，适合于中国和其它新兴大众市场的运输和建筑应用。东风商用车位于中国湖北省的中心，在华中、华西和西北有很强的市场地位，从而在中国中部的崛起和中国西部大开发中起到非常重要的作用。其广泛的销售和售后服务网络能快速响应客户的需求。公司本身及其网络能够把一带一路的国家（其中大部分是新兴经济体）很好地联系起来。为了抓住这个一带一路计划带来的机遇，东风商用车付出了特别的努力，包括推出新的产品型号，加强销售和服务网络。

由于沃尔沃集团于 2015 年初就通过投资 60 亿人民币进入这家合资企业，沃尔沃已经开始将核心技术和竞争力注入该公司。越来越多的技术和能力正在计划或讨论中，在不久的将来将注入该公司，这将支持东风商用车显著提高其产品的功能和能力，从而更好地服务其国内和国际客户。所有这些都表明了沃尔沃对中国发展的承诺，这也将为一带一路计划作出巨大的贡献。

此外，还有一些高科技的解决方案可以保证交通更加安全。例如，对于重载卡车来说，如果冬季道路湿滑，就有较高的制动折叠危险¹。沃尔沃卡车公司创新的伸缩制动系统可以防止制动折叠事故的发生，为在恶劣条件下驾驶车辆的驾驶员提供更好的车辆控制。这种系统在下坡行驶过程中尤其可以发挥作用。

另一个解决方案是具有碰撞预警功能的高级紧急制动系统（AEBS）。2013 年在面向欧洲市场的沃尔沃 FH 系列卡车上推出了这种先进的制动系统。这种系统配置两个传感器：

- 判断前方车辆距离和速度的雷达
- 提供前方车辆类型信息的摄像头

如果系统探测到即将发生碰撞，将警告驾驶员。如果驾驶员没有反应，系统将自动制动，避免碰撞。

车辆安全系统在预防事故和减少事故影响方面起着重要作用。但是对于 90% 的涉及人为因素的交通事故来说，提高安全性的最有效方法除了技术性解决方案，还有增强驾驶员、社会的交通安全意识和增加驾驶员、社会的交通安全培训。沃尔沃集团从 20 世纪 80 年代以来就一直在成功地实施这类项目。驾驶员培训和教育项目已经在巴西、阿根廷、秘鲁、摩洛哥、瑞典、挪威、丹麦、俄罗斯、爱沙尼亚、印度、新加坡、中国和韩国等国家实施过。

- **城市和农村地区的公共交通**

为了解决市区的拥堵问题，并为农村地区的人们更好的交通，应该强调公交车在公共交通中的作用。

快速公交系统（BRT）是一种基于公交客车的系统，有时也被称作“地上地铁”。它将地铁或者轻轨系统的容量、速度与公交系统的低成本、灵活性结合在一起。BRT 系统是由沃尔沃客车公司开发的，它颠覆了城市交通的游戏规则：该系统能够以大约 5% 的成本实现地铁的速度和容量。现在全球拥有大约 250 个 BRT 系统，包括在中国一些城市的应用。

¹ 牵引车与拖车的会在制动失灵时出现折叠现象，就像折叠的电工刀。

BRT 系统的典型要素包括大容量客车、专用客车道、交叉路口优先通行权、进入客车和站台之前收费系统、乘客信息系统以及高度与客车地板相同的站台。更大的容量可以减少通道中运行的车辆数量，进而提高系统的平均速度，减少污染物的排放和运营成本。

举例说明：37 辆 24 米双铰接客车的载客能力，与 2000 辆满载有 1 位司机和 4 名乘客的乘用车是相同的（请注意，在拥挤的路面上，很难看到满载着 5 人的小轿车）。

沃尔沃集团在数十年之前就开始联合巴西库里提巴市开发 BRT 系统。库里提巴现在是巴西最繁华的城市，但是由于采用突破性的综合土地利用和交通规划方法，人均温室气体排放量比全国平均水平低 25%，燃油消耗量低 30%。

电动化。哥德堡（沃尔沃集团总部所在地）的 ElectriCity 是学术界、工业界和公共部门之间的合作项目，旨在为未来开发、展示和评估新的可持续公共交通系统。电动公交运输的测试和评估是 ElectriCity 的核心部分。无声、无排放的公共交通可在目前禁止交通的地方运营。这在城镇的城市规划开辟了新的可能性。三辆电动公交车正在上路运行，采用可再生能源发电，高效节能，静音，完全零排放。公交车使用的电池可在公交总站，用可再生能源快速充电。乘客可以使用车载 WiFi 上网和手机充电设施，其中一个公交站还是室内的。除了这三辆全电动公交车，该线路上还有很多电动混合动力公交车，它们在线路的约 70% 上靠电力运行。除了实际的公共汽车，ElectriCity 还开发并测试新的公交站解决方案、运输管理系统、安全概念和能源供应系统。

全电动客车将提供：

- 低噪音的交通运输
- 本地零排放——为室内公共汽车站，例如室内购物中心，提供了机会
- 二氧化碳排放量减少 99%（基于无需化石燃料的瑞典发电）
- 能源节省 80%

本项研究还有一个目的是让公交出行成为目的地之间优先选择的交通模式。出行便捷和其他优势将促使人们选择乘坐公交车，而不再驾驶他们的私家车。

- **融资计划**

一带一路被作为一个开放的平台来推广，鼓励所有的企业利益相关者和投资者参与。随着庞大的基建计划就位，预计金融解决方案将对维持该计划非常重要。沃尔沃汽车金融公司（VFS）为中国、印度、日本、澳大利亚和世界各地的其它 40 个国家的经销商和客户提供金融解决方案，以便于设备购置的需求。我们为沃尔沃集团的客户提供金融服务，帮助他们初始购买，车辆更换，并扩大其业务，这将积极支持一带一路计划的发展。沃尔沃汽车金融还为沃尔沃集团的经销商网络提供金融服务，帮助经销商为购买和运行设备的客户提供服务（例如销售、保养、配件、维修）。沃尔沃汽车金融可以用行业知识和专业技能提供金融服务，为帮助客户及经销商获得可持续的性能，同时通过交通解决方案来推动繁荣。

- **智能交通运输系统**

随着信息和通信技术 (ICT) 的发展，沃尔沃集团一直致力于相关的应用和解决方案，利用 ICT 在可持续交通运输互联中的作用。仅举几例，远程信息处理和 ITS 解决方案。

车联网是一个基于车辆无线互联的技术领域。互联服务能够改变城市交通运输的实现方式。目前全球有大约 300,000 辆沃尔沃集团汽车正在使用互联服务。互联服务包括远程诊断、燃油管理和驾驶员指导。互联服务不局限于商业交通运输，社会作为一个整体，互联程度日益增加，因此，对于任何国家来说，车联网和互联服务都应当是战略重点。互联服务有许多好处，包括：二氧化碳和有害污染物排放量减少，对于车队运营商来说，运营成本减少，车队利用率提高，车辆正常运行时间增加（可用性），通过更好地了解车辆使用情况和运行状态，最大程度降低了保险和租赁公司风险。

术语 ITS 表示智能交通运输系统。它采用现代化的通信技术保证出行更智能、更安全、更快捷方便。ITS 包括智能交通控制系统、旅客信息系统、自动

收费系统和车队管理系统以帮助商用车操作人员以更高效的方式管理车队。大量的研究以及欧洲、美国和日本的试点项目已经证明，ITS解决方案能够提高燃油效率、减少交通事故和缓解交通拥堵。绿灯车速优化建议系统(GLOSA)是最有希望的早期应用之一。沃尔沃在实际城市路网上的试验表明节油率最高可达 12%。城市交通控制中心通过整合GLOSA系统，可进行拥堵预测，进一步改善交通流量。

五、结论和政策建议

交通运输解决方案和互联互通是增长和福祉的重要推动者。如果没有交通，我们的生活的社会就无法正常运作。上面的例子表明，交通解决方案将为该地区的可持续发展提供借鉴。

虽然一带一路给基础设施建设、物流和交通互联互通带来了广泛的机会，但跨国公司还可以发挥更重要的作用。为成功应对如上所述的复杂情况，中国需要创新合作模式。在交通互联互通领域，城市或项目所有者需要与不同的组织（公共组织和私人组织）、承包商、供应商、服务供应商、运输商、保险公司和其他组织合作。从中国的角度来说，中国可以受益于全球其他国家和地区的成功经验。其中，在中国经营发展的跨国公司就是一个重要的信息来源。通过与中国企业密切合作，在交通运输互联领域领先的跨国公司也可以为一带一路的进步做贡献，同时从增长中获得收益。

目前，某些政策领域仍存在一些挑战。**透明度问题：**虽然一带一路早已推出，并进行了大量的讨论，但关于中国政府的实施计划和相关政策的重要信息还没有整合，并且有关如何参与这些有前景的标志性项目的信息来源有限。**公平问题：**由于一带一路本质上是政府主导的倡议；对于中国政府而言，向有志于参与其中的所有利益相关者提供一个公平竞争的商业环境至关重要。

本报告重点想强调，没有一个参与者能单独解决我们今天所面临的挑战。因此，我们需要合作和联盟。沃尔沃集团已经开始并准备与中国的参与者共同努力，将双方合作提升到一个新的更高的水平。

根据上述内容，建议中国国家和地区发展计划考虑以下几个方面：

- **可持续发展需要持续的投资。**要充分利用跨国公司的优势并挖掘潜力，关键需要为“一带一路”提供持续的政府主导的投资，保持可持续交通运输互联互通的发展势头，并为项目引入新的融资模式，从而为跨国公司更积极地参与一带一路计划创造动力。
- **建立公平的竞争环境。**所有的商业合作伙伴，包括中国国有企业，中小型企业或跨国公司，都应该获得平等的地位，这样才能鼓励他们形成跨地域和跨行业的合作伙伴协作体，并充分发挥各自的比较优势。
- **政策协调十分必要。**为了改善交通的互联互通，应考虑建立一个跨区域协调的政治和政策环境，尤其是对交通运输政策的协调和车辆一致性认证等方面提供便利。
- **应兼顾全方位考虑。**为了推动实现一带一路的愿景，交通运输解决方案和互联将成为重要的铺路石。创新驱动是可持续发展的关键，应该始终采取全面的方法，平衡解决经济、环境和社会的多维度的问题。

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Transport Solutions and Connectivity: Driving Prosperities around the Belt and Road

Volvo Group

Executive Summary

The One Belt and One Road (OBOR) Initiative is a development strategy and framework, proposed by the People's Republic of China in 2013 that focuses on connectivity and cooperation among countries.

Transport is essential in facilitating movements of goods and people and plays a significant role in the social and economic development of countries and regions. The better the transport connectivity, the more each of the transport network users will benefit. Regional infrastructure development creates a win-win outcome for all participating countries, and improving transport connectivity in the region would bring Asia large welfare gains through increased market access, reduced trade costs and more efficient energy production and use.

In this paper, Volvo Group analyzed opportunities and challenges within the region, and collected examples in areas of transport solutions and infrastructure building. The following policy recommendations were also presented for China:

- **Sustained development needs sustained investment.** To utilize the talents and tap the potentials of the MNCs, it is crucial for the OBOR to provide sustained Government-led investment to boost the momentum of sustained transport connectivity development, and introduce new modes of funding for the projects, so as to create incentives for more active engagement of the MNCs in the OBOR endeavor.
- **A level-playing field should be created.** All business partners, Chinese State Owned Enterprises, SMEs or MNCs, should be provided with an equal footing, thus they can be encouraged to form partnerships across

continents and industries, and make the best use of their respective comparative advantages.

- **Policy coordination is much needed.** To improve the transport connectivity, a coordinated political and policy environment across the region should be established, and harmonization of transport policies and homologation should, in particular, be facilitated.
- **Holistic approach should be taken.** To deliver the outcome of the OBOR, transport solution and connectivity would be important stepping stones. Promotion of innovation is the key to sustainability, and a holistic approach should always be taken by balancing economic, environmental and social considerations.

I. Introduction

With Asia's continuing rise and growing impact on the global economy, regional integration is expanding, bringing with it both benefits and costs. With an expanded market for goods and services, for both output and inputs, higher economic growth and improved welfare can be expected. Integration helps more efficient resource allocation across the region (or globally) in line with the principle of comparative advantage. The Belt and Road Initiative, which was first initialized by China in 2013, is considered as one of the driving forces in establishing a framework of regional cooperation, which may be beneficial to all. Given the complexity and extent of regional development, no single actor is able to address all relevant aspects. The aim of this paper is to present knowledge-based recommendations related to regional integration and common prosperity, particularly with regard to the Belt and Road Initiative. The scope has therefore been limited to the Volvo Group's area of expertise – that is, transport solutions and connectivity.

Transport is the foundation of any economy and a key factor in a high quality of life. Any nation striving for growth and for a sustainable society must have transport high on the political agenda. This paper contains a number of practical examples of what can be done, but also several policy recommendations for China.

The Volvo Group is one of the world's leading manufacturers of trucks, buses, construction equipment and marine and industrial engines. We also provide complete solutions for financing and service. By developing and delivering products and services under different brands, we can address many different customer and market segments in mature as well as growth markets. We are close to 100,000 colleagues. Our industrial footprint includes product development and manufacturing or assembly plants in more than 19 countries and we sell our products in more than 190 markets. Our mission is: ***“Driving prosperities through transport solutions”***, and we carry on this mission with ***“Customer Success, Passion, Trust, Change and Performance”*** as corporate values.

In 1992, the Volvo Group set up its first office in China. Over the past years, all business areas within the Volvo Group have entered China successfully. Today, Volvo Group's combined businesses cover more than 22 provinces, cities and

autonomous regions across the country with approximately 6,000 employees. China has become the second “home market” after Volvo’s Global Headquarters in Sweden.

II. About the Belt and Road Initiative

1. Basic Facts

The Asian Development Bank’s study estimated that Asia needs to invest approximately US\$8 trillion in overall national infrastructure and about US\$290 billion in specific regional infrastructure projects between 2010 and 2020. And to tap its full economic potential, Asia is faced with the challenge of building regional infrastructure that provides efficient and seamless connections across the region and to the rest of the world.

In 2013, Chinese President Xi Jinping initiated the concept of building a land-based “Silk Road Economic Belt” and a “21st Century Maritime Silk Road” during his visits to Central Asia and Southeast Asia. There are 47 countries along the “Silk Road Economic Belt” and 33 countries along the “21st Century Maritime Silk Road”, covering a total population of 4 billion (about 63% of the world’s population) and aggregate GDP of US\$20 trillion (29% of the world’s total). The two routes, later referred to as the “One Belt, One Road” (OBOR) initiative, will create a massive loop linking three continents, connecting China with Southeast Asia, Asia-Pacific, Middle East, Europe and North Africa on land and maritime “economic corridors”.

On the 28th March 2015, an official document themed "*Visions and Actions on Jointly Building Belt and Road*" was issued by the Chinese Government, detailing various aspects of the envisioned process, involving economy, finance, culture and security. According to this document, infrastructure inter-connectivity is the prioritized area of the OBOR, expedited investment and commercial cooperation will be the backbone, and efficient flow of capital is regarded as the pillar.

2. Recent development

With the "Visions and Actions" in place, the deployment of the OBOR is accelerating. Various Ministries and Commissions at the central Government level,

including the National Development and Reform Commission, the Ministry of Commerce and the Ministry of Transport, have introduced supporting plans and measures. Furthermore, all of China's 34 provinces, municipalities and autonomous regions have completed their respective development of a specific implementation scheme of the OBOR by October 2015. Among which, "Yangtze River Economic Belt", "Rise of Middle China", and "Integration of Beijing-Tianjin-Hebei" are serving as domestic regional integration strategies that support China's further development. There is no doubt that the implementation of the OBOR strategy to promote regional comprehensive development is high on China's political agenda at all levels and the momentum is picking up.

Moreover, to make available of the financial pillar for the OBOR and translate the Government's vision into reality, the OBOR is strongly backed by substantial financial institutions and mechanisms as its "cash pool", namely, the Silk Road Fund (SRF) and the Asian Infrastructure Investment Bank (AIIB).

The US\$40bn Silk Road Fund, jointly supported by the China Investment Corporation (China's sovereign wealth fund), China Development Bank, the Export-Import Bank of China and the State Administration of Foreign Exchange, entered into force in February 2015, aiming at providing direct support to the OBOR. Its mandate is to help improve connectivity along the OBOR by financing infrastructure (railways, roads, ports and airports), resources, industrial and financial co-operation projects.

Meanwhile, the Asian Infrastructure Investment Bank, as initiated by China in October 2013, was officially established in Beijing on the 25th December 2015 with 57 Founding Members. The Swedish Government applied to join the AIIB on the 31st March 2015 and was approved as the Founding Member on the 15th April 2015. The AIIB, with its US\$100bn initial capital, is designed to help finance construction along OBOR as well. The AIIB's stated aims are to combine China's core competencies in building infrastructure with financial resources to help development in other parts of Asia in the field of transportation and telecommunications, energy and power, urban development and logistics, rural infrastructure and environmental protection.

3. Outwards investments serve as stepping stones

According to China's National Bureau of Statistics and the Ministry of Commerce, China's outward foreign direct investment (FDI) increased 8 times between 2005 and 2015. With the enhancement of their capital and technical strength, more Chinese enterprises are seeking to use their resources worldwide, and to take advantage of the benefits of their global expansion. Outbound investment has become an essential method for enterprises to gain factors of production, improve innovation and core competitiveness, and realize an upstream shift in their industrial chain. The robust outwards investment of China laid a solid foundation for realizing the vision of this gigantic initiative.

Though the OBOR is still, for the time being, in its early stage of development, taking into account the OBOR's special focus on and the great importance attached to the infrastructure inter-connectivity, the transportation sector offers promising prospects and thus it is high time for related companies to stipulate plans accordingly and take actions to lock in the opportunities.

III. Transportation solutions and connectivity are key enablers for regional prosperity

1. Global outlook on transport infrastructure investment

The transportation and logistics industry forms the backbone of modern global supply chains. The transport logistics industry encompasses freight transportation, warehousing, border clearance, payment systems and, increasingly, many other functions outsourced by producers and merchants to service providers. Worldwide, the performance of transport logistics companies varies greatly. One of the main reasons for this is the quality of infrastructure, which is fundamental to their effective operation. The World Bank logistics performance index shows that there is a wide difference between country performances, and this issue is difficult to address because each country has its own challenges and there is no single solution. It is important, therefore, to consider each country's unique situation when devising a strategic plan for transport infrastructure investments.

From the global perspective, according to PWC's report "*Assessing the global transport infrastructure market: Outlook to 2025*", transport infrastructure investment is projected to increase at an average annual rate of about 5% worldwide over the period of 2014 to 2025. Divided by region,

Asia-Pacific, as a result of the shift in economic power from the West to the East and the rise in Asian wealth and rapid urbanization, remains by far the largest transport infrastructure market, with investments increasing from US\$557bn per year to nearly US\$900bn per year in 2025. Large-scale development of transport networks will likely continue in many economies in the region. Significant investment in road infrastructure as a means to accommodate increasingly more cars, along with investment in public transport infrastructure to relieve congestion in urban areas, is expected. Strong growth in sea port infrastructure is also anticipated to support expansion in international trade.

Regarding **Eastern Europe**, most countries currently devote a smaller percentage of infrastructure investments to transportation than the global average, though this is projected to change over the forecast period. Investment in good transport networks remains relatively important due to the need to transport extractive outputs to other markets. Spending on ports, in particular, is expected to increase an average of nearly 10% annually from 2014 to 2025.

As per the **Middle East and Latin America**, roads still make up the largest subsector for transport spending. Rising wealth levels will drive strong increase in the rate of car ownership over the coming decade. Consequently, investment in roads is expected to increase sharply by almost 116% over this period to reach US\$31bn per year by 2025, and by an average of 11% per year until 2025, for the two regions respectively.

For **Africa**, Sub-Saharan Africa is the fastest growing regional infrastructure market, with a projected average increase in transport spending of over 11% per year from 2015 to 2025. Most of this growth is expected in roads and ports.

By contrast, the **US, Canada, and Western Europe** will see modest transport infrastructure investment in the near future, given the already well-developed transport networks in many advanced countries, as well as continued fiscal constraints facing the Governments.

2. Scope and classification of transport connectivity

In the view of promising transport infrastructure investment outlook, whereas different levels of development of transport infrastructure among the countries in the region, and high dependency nature of transport logistics industry on

infrastructure, there is a missing link in connecting the region in order to boost its development, which could only be filled in with transport connectivity.

Connectivity refers to the state, quality and capability of being connected or connective. In a broader sense, transport connectivity could refer to five major aspects;

Infrastructure building connectivity. Bridges, ports, airports, train stations and other transport infrastructure facilities should all be connected seamlessly by road, sea route or airline in the most effective way.

Logistics and supply chain connectivity. Exports are diversifying across new markets, and intraregional trade in parts and components for regional supply chains accounts for a growing share of total trade. These trends underscore the need for efficient and flexible logistics networks that provide uncomplicated connections between different modes of transport and make it possible to trade with more places, in less time, at lower costs.

Urban and inter-city mobility. Densely populated and heavily congested as the cities are, public transportation should play a leading role to ensure the free movement of people.

Transport data connectivity. With the recent technology advancement, the volume and speeds at which transport data today is generated, processed and stored is unprecedented. Good data connectivity could make possible safe and efficient movement of goods and people, and in the extreme case, prevent or address possible threats, both natural and man-made.

Transport policy connectivity. Standards and regulations for vehicles and infrastructure should be harmonized by coordinating relevant transport policies.

Transport connectivity is essential to facilitate movements of goods and people and plays a significant role in the social and economic development of countries and regions. The Asian Development Bank's study found that the benefits of improving the region's transport connectivity are substantial, and that all countries in the region would benefit. Also, the better the transport connectivity, the more each of the transport network users will benefit. Regional infrastructure development creates a win-win outcome for all participating countries and improving transport

connectivity in the region would bring Asia large welfare gains through increased market access, reduced trade costs, and more efficient energy production and use.

3. Major business opportunities from the OBOR

According to the press release from the Ministry of Commerce, from January to July in 2015, the OBOR has already announced more than 1400 contracted projects initiated by the Chinese Government, relating to high-speed rail, electricity upgrades, port development and enhancement. Meanwhile, Chinese companies have made US\$8.59 bill FDI in 48 countries alongside the OBOR, with a year-on-year increase of 29.5%. Further, Chinese companies have signed 1786 contracts worth of US\$49.4 bill with 60 countries involved in the OBOR, with a year-on-year increase of 44.9%.

Rapid development of the OBOR will bring major business opportunities. For instance, in the short run, the infrastructure projects, both ongoing and those in the pipeline, spur the demand of construction equipment. While in the long run, trade flow requires improved capacity to move goods and people efficiently along the OBOR, making long-haul transportation exceptionally important. Moreover, as transport networks get more complex and crowded under the OBOR context, mixed-mode journeys will be common due to the strengths and weaknesses of various transportation options, thus transport data exchange and utilization become more critical in terms of improving the transport connectivity among the countries alongside the OBOR.

4. Main challenges and obstacles within the region

Given the wide range of countries and the sums of money involved, a proper assessment of challenges and obstacles within the region will be necessary, thus companies building their presence along the OBOR could prepare themselves for potential threats to their operations in these new markets.

- **Geopolitics and security**

Foremost, some of the countries along the OBOR are beset by armed conflict, for instance, Afghanistan and Iraq. Further, in comparison to FDI activities led by private companies, political risks may weigh heavier on OBOR efforts, as many OBOR projects are slated to be high-profile construction projects, which means

that the deals will be made with the heavy involvement of the destination country's Government. In this connection, security instability needs to be anticipated in some countries.

- **Business operation risks**

Since some of the OBOR projects will be financed by either SRF or AIIB, it is important to take into full account the possible inability to pay back loans, and a rigorous assessment of credit risk in the countries in which the companies will be operating would be necessary. Apart from that, other factors, including government effectiveness, the legal and regulatory environment, macroeconomic risks, foreign trade and payment issues, labor markets, financial risks, tax policy, the standard of local infrastructure, should all be carefully analyzed in the evaluation process of business operation risks.

- **Inadequate “hard” and “soft” infrastructure**

Among the OBOR countries, most of them are developing countries. Necessary bridges, ports, airports, train stations and other auxiliary transport infrastructure facilities will not be guaranteed due to their relevant less developed status, let alone diversified transport modes and efficient transport products. For those relatively more advanced countries, road congestion presents an increasing problem. There is a lot of pressure to find transport solutions to reduce congestion in cities. And in many of the large cities, a major transport infrastructure upgrade is vital to allow the city to function effectively.

Meanwhile, as a result of relatively lower level of economic and social development, most of the OBOR countries would not have well developed Information and Communication Technology industry in place, and they are often faced with a lack of skilled workers and insufficient management capacity in the transportation sectors.

- **Incoherent transport policy in cross border movement**

Another challenge will be the incoherent transport policies among the countries as they are located in different regions and have their respective different historical backgrounds, which makes the homologation of transport standards highly difficult. Since the OBOR involves a number of neighboring countries which are connected

by road, another critical, perhaps a paramount obstacle facing the transport connectivity in the region is how to expedite the cross-border movement through a more coordinated transport policy, by joint collaboration among transport authority in each country.

Improving regional transport connectivity involves more efficient use of border crossing points. Usually, these border crossing points pose a threat to the smooth flow of goods and people. The level of smoothness of transport operation can vary widely depending on the location of borders and the cooperation of the neighboring country, weight and dimension of vehicles, existing agreements, and on origin and destination and type of cargoes. The border clearance process can also vary along the transport routes. Some of the commonly found non-physical barriers are: Inconsistent, time consuming and costly border crossing formalities and procedures; Restriction or limitation on entry of vehicles; Transshipment needed at the border; Different standards of vehicles and drivers; Restrictive visa requirement; Difficult and different process for transit traffic; Incompatible working hours at borders; Coordination among various stake holders; and Excessive security checks.

IV. Synergies between Volvo Group's solutions and regional development

Today, several of the global challenges the world faces are directly or indirectly related to the infrastructure and the transport sector. They include climate change, population growth, urbanization and the shortage of natural resources and raw materials. To address urgent global challenges and contribute positively to economic, social and environmental development, transportation needs to be made more efficient and more sustainable.

Since Volvo Group's products and services play an important role in transporting people and goods and building roads and infrastructure, the Volvo Group is committed to and takes an active part in finding, developing and delivering transport solutions to improve economic and environmental performance in both the short and long term, while considering the social impact at all times. We see ourselves as a good business partner to be part of Belt and Road initiative and promote regional development.

- **Infrastructure and urban utility**

Most of the countries along OBOR are less developed than China in terms of infrastructure. Thus transport connectivity is the key priority of the OBOR, and infrastructure development is a much needed first step in unlocking this bottleneck. Increasing infrastructure investment programs will undoubtedly benefit construction machinery manufacturers, infrastructure construction companies, building materials producers, as well as infrastructure operators in China. Having an established presence and enviable reputation in China, Volvo CE and its Chinese joint venture partner SDLG are in a good position, along with their business partners, to share in the opportunities the OBOR offers, since China is the driving force behind the project. Volvo CE and SDLG are among the market leaders in the all-important excavator and wheel loader segments in China and able to provide a comprehensive range of integrated products and services for infrastructure construction. And through Volvo CE's Terex Trucks brand, the company is also a leading hauler manufacturer in China.

With a history dating back over 180 years Volvo CE is the longest established global producer of products and services for the construction, extraction, waste processing, forestry and materials handling sectors. The company's products – excavators, wheel loaders and haulers, as well as road machinery, such as pavers and compactors – have been used on major infrastructure projects worldwide. These include port development (Salalah, Oman), land reclamation (Dubai, UAE) and airports (Changi, Singapore), as well as the biggest 5-year railway construction project between China and Mongolia with a total length of 1,837 km, and numerous pan-national highways (e.g. A2 project, in Poland, Dassu hydropower station in Pakistan). A wide range of services are also offered, centered on the three themes of machine uptime, fuel efficiency and increased productivity. The company's products and services are sold and supported via a global network of over 125 Volvo-owned and independent dealers.

Volvo, via its three brands, has a long established presence in China, both in terms of major production facilities in Linyi and Shanghai, as well as a major research and design facility in Jinan and sales offices in Shanghai. The company has also made a significant contribution to the rapid development of Chinese infrastructure in recent years. In 2010, a team of Volvo road machinery helped to resurface

Beijing's famous 10 lane Chang'an Avenue that runs across Tiananmen Square. Volvo pavers were also used to renew the surface of China's first desert expressway – stretching through more than 134 km of barren land to the borders of Inner-Mongolia.

Volvo Construction Equipment sees itself within the Volvo Group as an instrumental partner in helping to bring the OBOR to life.

- **Logistics and transportation**

Logistics is crucial to the development of the region. The goal of the OBOR is to connect all businesses involved in the supply chain by eliminating unnecessary trade barriers, and to make the trading process shorter and easier. With the necessary connectivity and network in place, the OBOR will speed up the movement of goods and encourage businesses to set up trans-national presence in Asia. The booming cross-border trade and engineering projects will eventually create strong business needs in surface transportation both for consumption goods and special equipment. Considering Volvo Truck's robust business presence in the region, it can play a vital role in the emerging long-haul transportation business, and provide more efficient transport solutions for inter-regional trade.

As one of the largest Chinese commercial vehicle manufacturers, DFCV, the Volvo Group's joint Venture with DFG, has a full range of heavy duty and middle duty trucks that suit China and other emerging mass markets for both the transportation and construction applications. Located in the very center of China Hubei province, DFCV has a very strong market position in Central, West, Northwest China, thus plays a very important role in the rising of Center China and also the development of West China. Its extensive sales and after service network provide quick responses to its customers' needs. The Company itself and its network are well positioned to link the OBOR countries, most of which are emerging economies. DFCV has spent special efforts to capture the opportunities brought by this OBOR initiative, including launching new product models, strengthening sales and service networks.

Since Volvo Group entered into this joint venture by investing 6 billion RMB in the beginning of 2015, Volvo has started to inject core technologies and competencies into the company. More and more technologies and competencies are

planned or under discussions to be injected into the company in near future, which will support DFCV to significantly improve its product features and capability to better service its domestic and international customers. All these demonstrate Volvo's commitment to China's development, which will also make a great contribution to the OBOR initiative.

In addition, there are also high-tech solutions that would make traffic much safer. For heavily loaded trucks, for instance, the risk of jack-knifing¹ is high during winter when the roads are slippery. The Stretch Brake, a new innovation from Volvo Trucks, prevents jack-knife accidents and gives the driver better control of the vehicle in tough conditions. The system is especially valuable when driving downhill.

Another technical solution is the advanced emergency braking systems (AEBS) with Collision Warning. A sophisticated system of this kind was launched in Europe with the Volvo FH truck in 2013. The system is built on two sensors:

- A radar judges the distance and speed of the vehicles ahead
- A camera provides information about the kind of vehicles involved

If the system detects that a collision is imminent, the driver is warned. If there is no reaction from the driver, the system will automatically brake and avoid a collision.

Vehicle safety systems play an important role in preventing accidents and reducing their impact. But with 90% of accidents involving human factors, the most effective way to increase safety is to complement technological solutions with awareness and training for drivers and society. The Volvo Group has successfully run such programs since the 1980s. Driver training and educational programs have been run in countries such as Brazil, Argentina, Peru, Morocco, Sweden, Norway, Denmark, Russia, Estonia, India, Singapore, China, and Korea.

- **Public Transportation in urban and rural areas**

To address the congestion problem in the urban areas and provide better mobility for the people in rural areas, the role of buses in public transportation should be highlighted.

¹ Jack-knifing means the folding of a vehicle and the trailer it is towing in a way that resembles a folding pocket knife.

Bus rapid transit (BRT) is a bus-based system which is occasionally described as a "surface subway". It combines the capacity and speed of subway or light rail systems with the lower cost and flexibility of a bus system. BRT was developed by Volvo Busses and has been found to be a game changer for urban mobility: the system can achieve subway speed and capacity at about five percent of the cost. There are currently around 250 BRT systems globally, some of them in China.

Typical elements of BRT include high-capacity buses, dedicated bus lanes, priority at intersections, fare-collection before boarding the bus and platforms, passenger information system and bus floor on the same level. This higher capacity enables a reduction in the number of vehicles operating in the corridor, which consequently increases the average speed of the system, reducing the emission of pollutants, and operating costs.

To give just one example: thirty-seven 24 meter double-articulated buses will do the same transport work as two thousand passenger cars with one driver and four passengers per car (and it could be noted that cars with 5 persons are unusual on our congested streets).

Volvo started to develop BRT systems several decades ago together with the city of Curitiba in Brazil. Curitiba is today one of the most affluent cities in Brazil, but has 25% lower per capita greenhouse gas emissions and 30% lower fuel consumption than the national average due to its groundbreaking approach to integrated land use and transport planning.

Electriomobility. ElectriCity in Gothenburg, where Volvo Group headquarters is located, is a collaborative project between academia, industry and the public sector and is aimed at developing, demonstrating and evaluating new sustainable public transport systems for the future. Testing and evaluation of electric bus transport is a central part of ElectriCity. Silent, emission-free public transport can operate in places where traffic is currently banned. This opens up new possibilities for urban planning in towns and cities. The three electric buses on the route run on renewable electricity and are energy-efficient, silent and completely emission-free. The buses run on batteries that are quickly recharged with renewable electricity at the bus terminus stops. Passengers have access to onboard wi-fi and phone charging facilities and one of the bus stops is indoors. Besides the three completely electric

buses, the route has a number of electric hybrid buses which run on electricity for approximately 70% of the route. In addition to the actual buses, ElectriCity develops and tests new bus stop solutions, transport management systems, safety concepts and energy supply systems.

The fully electric model will deliver:

- Silent transport
- No local exhaust emissions – opens up the opportunity for indoor bus stops, such as inside shopping malls
- 99% CO2 reductions (based on Swedish fossil-free electricity generation)
- 80% energy savings

An additional aim of this study is to make the bus line the preferred mode of transport between the end destinations. The trip must thus be so convenient, and offer so many benefits that people choose to take the bus instead of using their private car.

- **Financing Scheme**

The OBOR is promoted as an open platform which encourages all business stakeholders and investors to participate. With the massive infrastructure program in place, it is anticipated that financial solutions will be of great importance to sustain the initiative. Volvo Financial Services (VFS) provides financial solutions to dealers and customers in China, India, Japan, Australia and in 40 other countries around the world in order to facilitate equipment acquisition needs. We offer financial services to Volvo Group customers to help them purchase their first vehicle, replace vehicles, and expand their operations, which in turn, supports the development of the OBOR initiative. VFS also provides financial services to the Volvo Group dealer network, which helps the dealers to provide customer services (e.g. sales, maintenance, parts, repairs) where the equipment is purchased and operated. VFS provides financing support with an industry knowledge and expertise that helps secure sustainable performance for customers and dealers, while driving prosperity through total transport solutions.

- **Intelligent Transport System**

With the development of Information and Communication Technology (ICT), the Volvo Group has been working on relevant applications and solutions to utilize ICT's role in sustainable transport connectivity. To name a few, Telematics and ITS solutions.

Telematics is an area of technology based on vehicles being wirelessly connected. Connected services could change the way transport is carried out in cities. There are currently around 300,000 Volvo Group vehicles around the world with connected services in operation. The connected services include remote diagnostics, fuel management, and driver coaching. Connected services are not limited to commercial transport: society as a whole is becoming more connected, requiring all nations to focus strategically on telematics and connected services. Connected services offer multiple benefits, including decreased emissions of CO₂ and toxic pollutants, decreased operating costs and improved fleet utilization for fleet operators, improving vehicle uptime (availability), minimized risks for insurance and leasing companies through better understanding of vehicle usage and operational status.

ITS stands for Intelligent Transportation Systems, which is about using modern communication technology to make travel smarter, safer, faster, and more convenient. ITS includes applications such as intelligent traffic control systems, traveler information systems, automatic toll collection, and systems that help commercial vehicle operators to make more efficient use of their fleets. The ability of ITS solutions to improve fuel efficiency, reduce accidents, and mitigate traffic congestion has been demonstrated in a number of research and pilot projects in Europe, the USA, and Japan. One of the most promising early applications is Green Light Optimization Speed Advice (GLOSA). Volvo experiments on real urban road networks have indicated positive fuel savings of up to 12%. By working together with the city's traffic control center to integrate the GLOSA system, it would be possible to implement congestion prevention algorithms that would further improve traffic flow.

V. Conclusions and policy recommendations

Transport solutions and connectivity are important enablers of growth and welfare. Without them, the societies in which many of us live would not function. The

examples above indicate that technology will provide some of the solutions for sustainability that the region will need.

While the OBOR promises a wide range of opportunities in infrastructure construction, logistics, and transportation connectivity, there is much that the MNCs can do. China will need new forms of cooperation in order to successfully address complex tasks such as the ones described above. In transport connectivity areas, cities or program owners therefore need to collaborate with various organizations (both public and private), contractors, suppliers, service providers, transport operators, insurance companies, and others. From a Chinese perspective, it ought to be of interest to benefit from experiences in other parts of the world. Multinational companies with a presence in China constitute one source of information. In close collaboration with the Chinese companies, leading MNCs in the field of transport connectivity can contribute to the advancement of the OBOR, meanwhile benefit from its growth.

Nonetheless, some challenges remain in certain areas. **Transparency issue:** Though the OBOR has long been introduced and much discussion has been undertaken, vital information on the Chinese Government's implementation plan and relevant policies are not consolidated, and there is limited source of information on how to participate in those prospective iconic projects. **Fairness issue:** Since the OBOR is by nature a government led initiative; it is essential for the Chinese government to ensure a fair play business environment among all stakeholders, who are willing to participate.

The key message here is that no single actor can solve the challenges we are facing today. Collaboration and alliances are therefore needed. The Volvo Group already works in this way, and is ready to take collaboration with Chinese actors to a new and higher level.

Based on the findings in this work, it is recommended that Chinese national and regional development plans take the following aspects into consideration:

- **Sustained development needs sustained investment.** To utilize the talents and tap the potentials of the MNCs, it is crucial for the OBOR to provide sustained Government-led investment to boost the momentum of sustained transport connectivity development, and introduce new modes of funding

for the projects, so as to create incentives for more active engagement of the MNCs in the OBOR endeavor.

- **A level-playing field should be created.** All business partners, Chinese State Owned Enterprises, SMEs or MNCs, should be provided with an equal footing, thus they can be encouraged to form partnerships across continents and industries, and make the best use of their respective comparative advantages.
- **Policy coordination is much needed.** To improve the transport connectivity, a coordinated political and policy environment across the region should be established, and harmonization of transport policies and homologation should, in particular, be facilitated.
- **Holistic approach should be taken.** To deliver the outcome of the OBOR, transport solution and connectivity would be important stepping stones. Promotion of innovation is the key to sustainability, and a holistic approach should always be taken by balancing economic, environmental and social considerations.

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