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出國報告(出國類別：開會)

# 出席第 25 屆智慧型運輸系統(ITS) 世界年會報告

服務機關：交通部運輸研究所

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派赴國家：丹麥哥本哈根

出國期間：107 年 9 月 14 日至 9 月 23 日

報告日期：107 年 11 月 30 日

## **出席第 25 屆智慧型運輸系統(ITS)世界年會報告**

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內容摘要：

第25屆ITS年會於107年9月17日(星期一)至21日(星期五)於丹麥哥本哈根舉行，本報告收錄參加第25屆ITS年會之心得與建議，ITS年會是國際間專業人士交流最新智慧運輸發展趨勢之會議，交通部運輸研究所長期扮演交通部智庫與國際合作交流之角色，參加ITS世界年會不僅可掌握先進交通運輸之發展動向，更可擴展國家公務人員前瞻創新之視野與磨練國際場合所需之外語與專業能力。交通部運輸研究所刻正在高雄都會區推動Mobility as a Service(MaaS)先導計畫，以通勤通學民眾為主要目標族群，運用資通訊科技整合包含公車、捷運、輕軌、共享自行車、渡輪與計程車等金流與資訊流服務，為了解歐美先進國家在Mobility as a Service之行銷手法、運具組合與推動策略，本次出國計畫特別著重於考察全球在Mobility as a Service之現況與發展方向，以及如何運用精緻、友善與便利的先進科技來推動創新之交通運輸服務模式，上開出國考察與研析結果可作為我國未來推動相關重要專案之參考。

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# 第一章 前言

## 1.1 出國目的

本屆智慧型運輸系統年會由 ITS 歐洲協會(ITS Europe,ERTICO)與丹麥哥本哈根市政府共同主辦年會，年會主題為「ITS-Quality of life」，希望能以丹麥首都，同是亦是世界最佳宜居城市之一的哥本哈根為標竿，展示歐美等先進國家如何將以人為本的理念落實於智慧交通管理與相關設施之設計。

第 25 屆 ITS World Congress 今年吸引來自超過 100 個國家超過 1 萬位國際交通相關產官學研專家前往分享與交流各國的智慧運輸成果與發展動態，年會主要內容包含論文研討、展覽與技術展示。本次（第 25 屆）年會由本所助理研究員陳翔捷奉派前往參加。

## 1.2 出國行程紀要

本次會議行程主要為參加第 25 屆智慧型運輸系統(ITS)世界年會，並於會議期間就近考察丹麥哥本哈根地區交通運輸系統概況。

本屆 ITS 年會於 107 年 9 月 17 日(星期一)至 21 日(星期五)於丹麥哥本哈根舉行，本所陳翔捷自臺灣時間 9 月 14 日(星期五)晚間自桃園機場啟程搭機，至法國巴黎戴高樂機場轉機(飛航軌跡詳如圖 1.1 與圖 1.2)後，並於丹麥時間 9 月 15 日(星期六)下午抵達丹麥哥本哈根。年會結束後於丹麥時間 9 月 22 日(星期六)晚間搭機返台，分別於荷蘭阿姆斯特丹機場與泰國曼谷機場轉機後，於臺灣時間 9 月 23 日(星期日)抵達桃園機場。出國行程紀要表詳如表 1-1 所示。

表 1-1 參加「第 23 屆智慧型運輸系統(ITS)世界年會」行程紀要表

出	日期	地點	主要行程概述
國	9/14-9/15	臺北-法國巴黎-	臺灣時間 9 月 14 日起程，
行		丹麥哥本哈根	於丹麥時間 9 月 15 日下午抵達。

程 說 明	9/16	丹麥哥本哈根	觀摩當地運輸系統及相關交通設施
	9/17-9/21	丹麥哥本哈根	參加年會
	9/22-9/23	丹麥哥本哈根-荷 蘭阿姆斯特丹-泰 國曼谷-臺北	返程， 於臺北時間 9 月 23 日晚間抵達桃園。

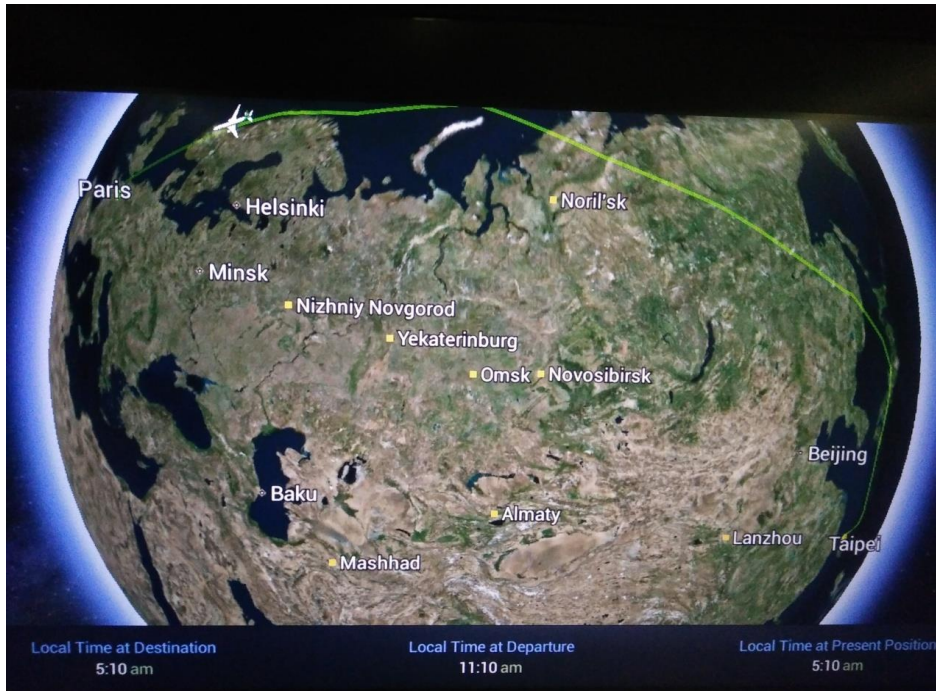


圖 1.1 臺北=哥本哈根航程軌跡圖(1)

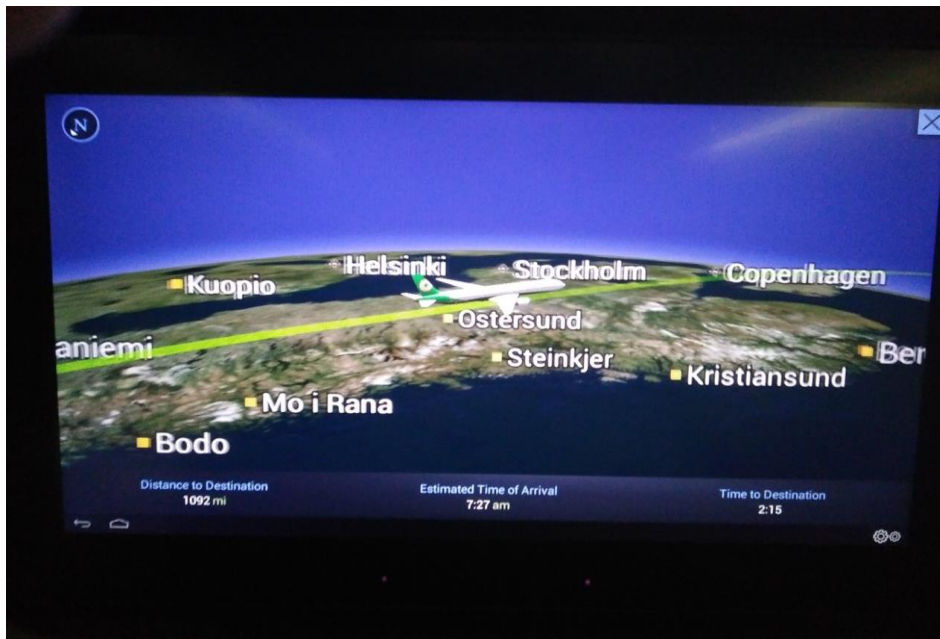


圖 1.2 臺北=哥本哈根航程軌跡圖(2)

本屆智慧型運輸系統(ITS)世界年會於丹麥哥本哈根舉辦，今年選定在貝拉會議中心(Bella Center)舉行，如圖 1.3 與圖 1.4 所示，貝拉會議中心位於丹麥哥本哈根地鐵站 M1 線之 Bella Center 站約 10 分鐘步行距離範圍內，參加年會者可自住宿飯店搭乘地鐵並步行前往 Bella Center，或搭乘由大會安排之自動駕駛電動接駁巴士前往，如圖 1.5 所示。



圖 1.3 哥本哈根貝拉會議中心 Bella Center(1)

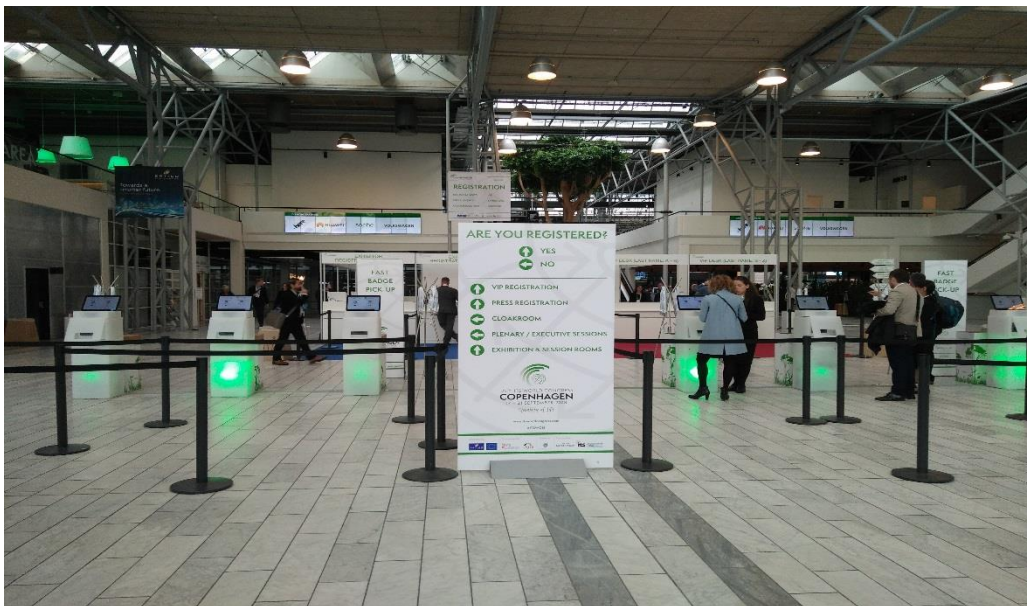


圖 1.4 哥本哈根貝拉會議中心 Bella Center(2)



圖 1.5 ITS 大會安排的地鐵站自動駕駛電動接駁巴士

### 1.3 哥本哈根城市與交通運輸紀要

本屆 ITS World Congress 會議地點為丹麥哥本哈根，哥本哈根於 2018 年被經濟學人評為世界宜居城市前十名，在交通發展上，丹麥提供良善的以人為本的交通環境，而市民也熱愛使用自行車與大眾運輸交通工具，如圖 1.6 為例，哥本哈根市民不僅將自行車當成通勤工具，更發展出多元的自行車乘載裝置，以自行車載運幼童或寵物，並善用自行車轉乘捷運等大眾運輸工具，人民自發攜手締造綠色交通風潮，以減低私人運具對城市空氣汙染與壅塞等外部成本的影響。



圖 1.6 哥本哈根市區自行車騎士停等於自行車專用道景象

在大眾運輸車輛的服務上，在丹麥哥本哈根地區的公車有為數不少懸掛賓士標誌的公車，雖然丹麥亦為高齡化國家，而其車體採低地板設計(如圖 1.5 所示)，在筆者的公車搭乘經驗中，公車不僅具無障礙設計且座位數較國內一般市區公車為多(如圖 1.7 與 1.8)。



圖 1.7 哥本哈根市區公車之無障礙設計



圖 1.8 哥本哈根之賓士廠牌公車外觀圖



圖 1.9 哥本哈根之賓士廠牌公車內部圖

在軌道運輸之列車設計上，其列車具有靜音車廂配置(如圖 1.10 所示)，在列車座椅上具有可調整式頭枕(如圖 1.11 所示)，可見北歐地區列車以人為本，強調乘坐空間舒適性的設計，以及列車在提供自行車人士的友善設計(如圖 1.12)。



圖 1.10 丹麥之列車靜音車廂設計



圖 1.11 丹麥之列車座椅可調整式頭枕設計



圖 1.12 丹麥列車在提供自行車人士的友善設計

此外在運輸系統的資訊提供上，丹麥地區的到站資訊儀表板設計(如圖 1.13)，在各重要場站採用液晶顯示螢幕整合包含公車、城市近郊鐵路與城際鐵

路的車輛到站資訊，其中到站資訊又可分為動態即時資訊系統的預估到站時間、列車發車時刻表等兩種資訊，其中值得觀察的是公車動態資訊不僅顯示下一班預估到站時間，更於資訊螢幕上顯示後續其他到達公車的預估到站時間。



圖 1.13 丹麥地區的到站資訊儀表板設計





圖 1.14 ITS 大會 (2018 年 9 月 16 日至 9 月 21 日間)公共運輸電子套票  
在運輸系統的票證資訊整合上，由於丹麥與其他北歐國家(如芬蘭與瑞典)一樣，致力於推動 Mobility as a Service 概念的多運具金流與資訊流整合系統，因此今年 ITS 大會特別提供全體與會代表在行動裝置 APP 上的 6 日(2018 年 9 月 16 日至 9 月 21 日間)公共運輸電子套票，可在丹麥大哥本哈根地區 1-99 個分區間不限次數搭乘公車、火車與輕軌，由於持有此種電子套票不需在各運輸系統進出站間進行刷卡，因此主要提供哥本哈根交通相關單位人員驗票時出示之用。

## 第二章 會議內容

### 2.1 年會概況與議程

近年來環保意識抬頭，加上行動裝置與 APP 之普及性，ITS World Congress 主辦單位開發大會 APP 供參與年會人士運用，APP 主要包含大會重要資訊、研討會各場次舉行之時間與會議中心地點、展覽等相關資訊外，2018 年 ITS World Congress 之 APP 如圖 2.1 所示。



圖 2.1 2016 ITS World Congress 專用 APP

陳員於丹麥時間 9/17(一)抵達本次 ITS World Congress 會場之 Bella Center 後，根據大會安排，以大會在事前以電郵寄送之 QR code 自助辦理辦理報到手續，如圖 2.2 所示，本次大會基於環保，僅發予年會參加者大會識別證，並未發送大會紙本手冊、文宣與相關大會紀念物品。



圖 2.2 ITS 年會與會代表於 Bella Center 自助辦理辦理報到手續



圖 2.3 2018 ITS World Congress 開幕典禮

陳員於辦理報到完成後，立即與本次 ITS 大會之臺灣代表團共同出席大會開幕典禮，如圖 2.3 所示，本次開幕典禮主要由 ITS World Congress 主辦單位邀

請 ITS 歐洲協會代表、ITS 美洲協會代表與 ITS 亞太協會代表進行演講，並於典禮中頒發各區域之終生成就獎(Hall of Fame)，如圖 2.4 與圖 2.5 所示，本次 ITS World Congress 由交通部王政務次長國材先生獲頒該獎項，王次長在 ITS 亞太協會主席 Hajime Amano 宣布獲獎後，上臺發表感言與接受大會頒獎。



圖 2.4 交通部王政務次長獲頒本屆 ITS 世界年會終生成就獎(1)

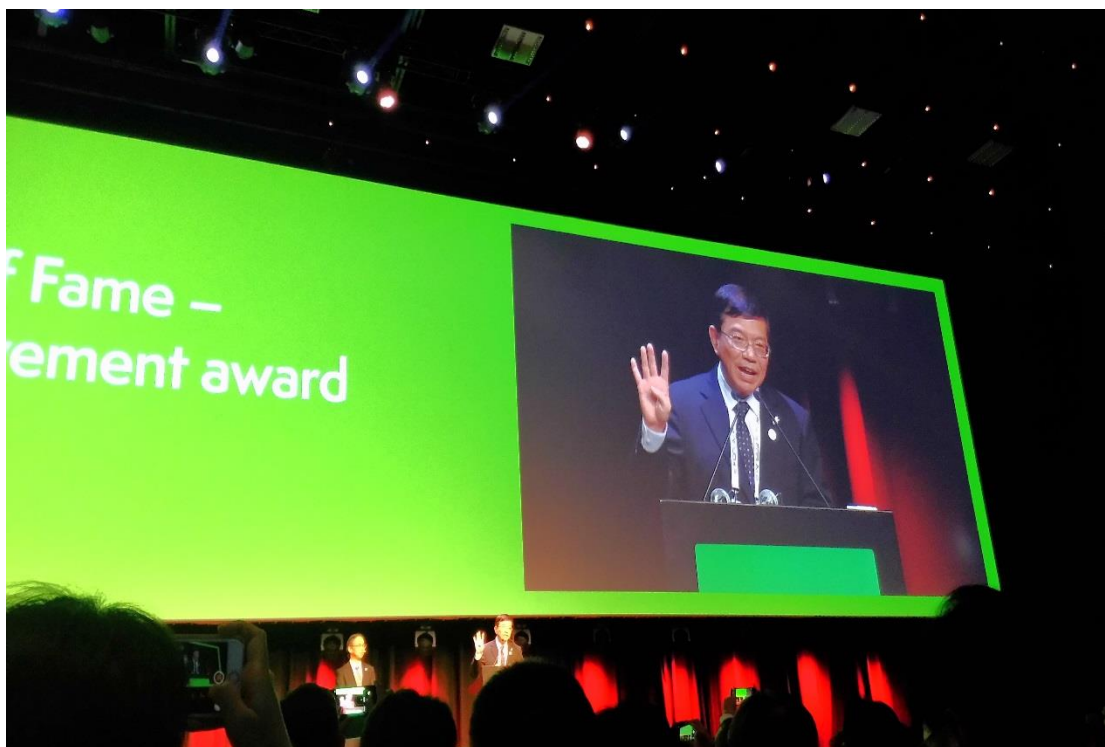


圖 2.5 交通部王政務次長獲頒本屆 ITS 世界年會終生成就獎(2)

本次大會更特別邀請丹麥皇室王子出席開幕典禮，如圖 2.6 所示，大會最後在開幕典禮結束前以皇室宮廷劇演出皇室與丹麥人民重視大眾運輸、人本交通的態度，如圖 2.7 所示，象徵丹麥人民舉國上下擁抱綠色交通，以及教育丹麥人民減少私家車旅次，以共創低碳安全的幸福城市的理念。



圖 2.6 丹麥皇室王子出席本屆 ITS 世界年會開幕典禮



圖 2.7 ITS 大會開幕典禮之宣導綠色交通皇室宮廷劇



圖 2.8 ITS 大會開幕典禮完畢後臺灣代表團合影(來源：中華顧問工程司網站)

本屆大會議程如圖 2.9 與圖 2.10 所示，本屆 ITS 世界年會參照過往年會辦理形式，大會研討內容主要由展覽(Exhibition)與技術展示(Demonstration and Technical visits)、Congress Sessions(專題演講)所組成。

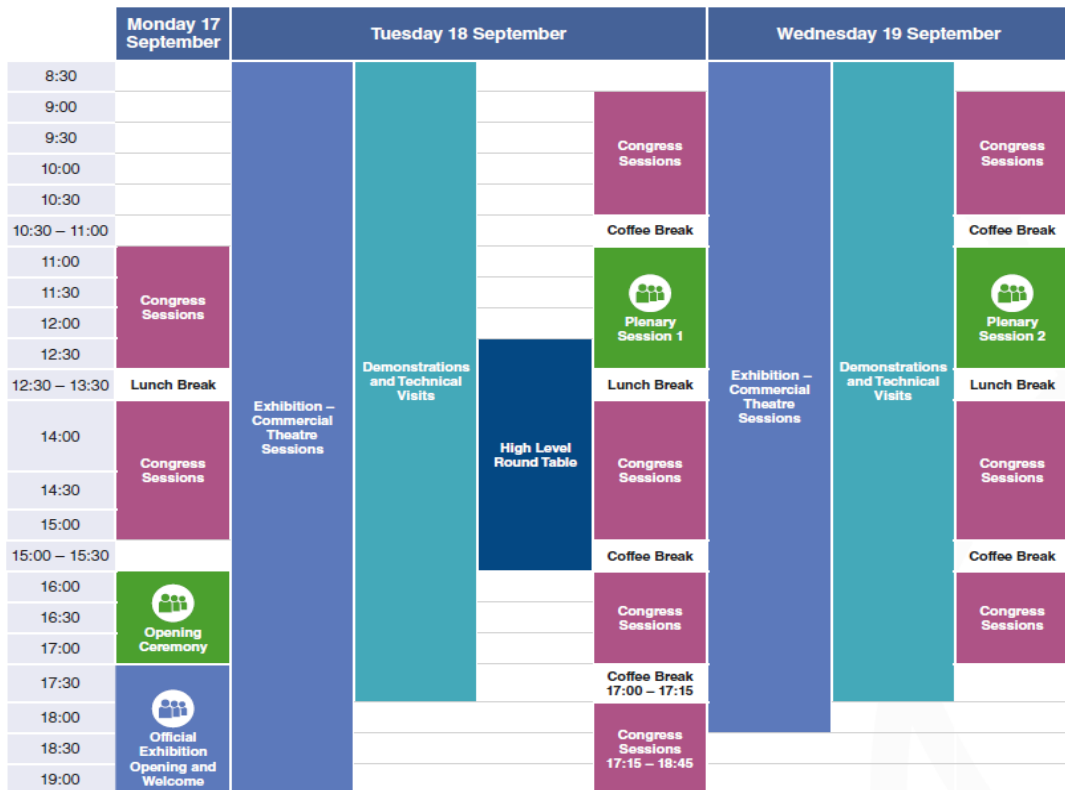


圖 2.9 2018 ITS World Congress 議程(1)

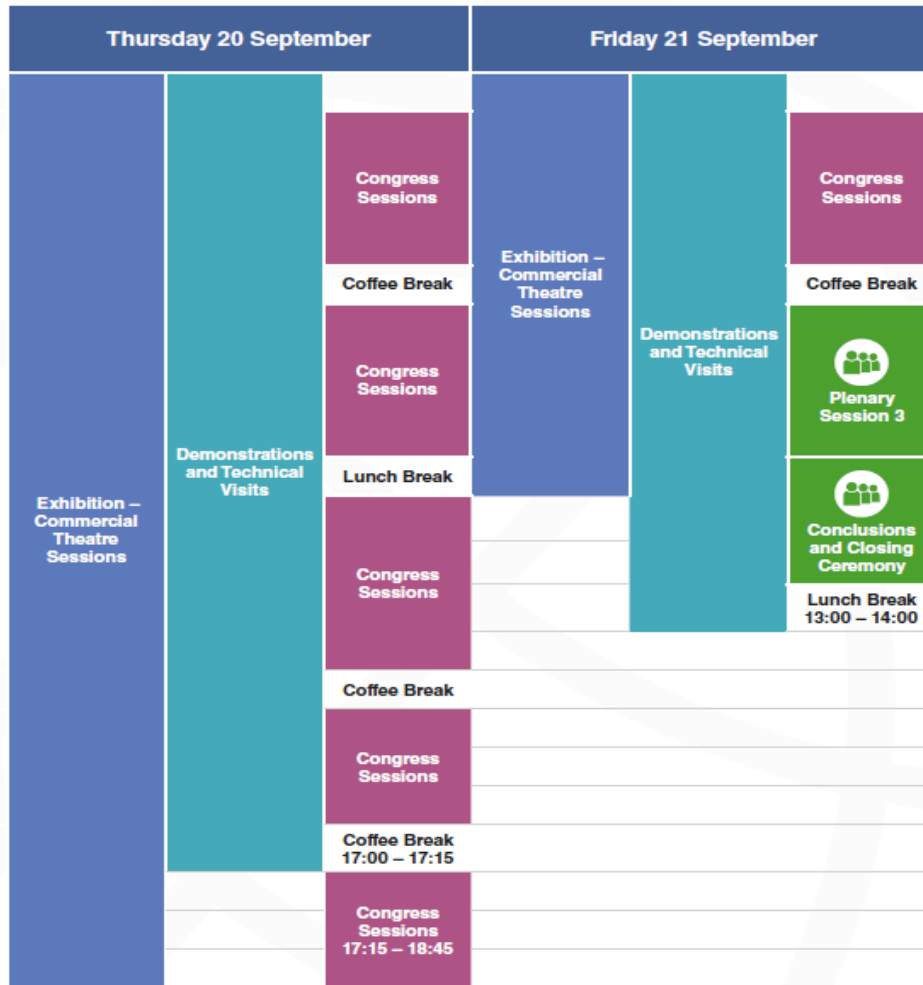


圖 2.10 2018 ITS World Congress 議程(2)

## 2.2 大會展覽與技術展示重點

本小節茲先說明 2018 年 ITS World Congress 在展覽與技術展示上之概況。本次年會臺灣代表團仿照過去慣例設置臺灣館，邀請臺灣交通主管部門、遠通電收、中華電信、工業技術研究院、資策會與臺灣世曦等產官學單位進行參展。



圖 2. 11 2018 ITS World Congress 展覽會場臺灣館攤位



圖 2. 12 2018 ITS World Congress 臺灣館開幕典禮

ITS 臺灣館在丹麥當地時間 9/18(二)下午舉辦開幕典禮，交通部王政務次長國材、ITS 臺灣協會張理事長永昌、ITS 亞太協會主席 Hajime Amano 等長官先進與臺灣代表團皆出席臺灣館開幕典禮，ITS 臺灣館除了向國際專家展示我國



智慧運輸發展成果外，該場地更扮演我國交通界和國際產官學研界對話及交流之平臺，如圖 2.13 與圖 2.14 所示，我國主要由工研院、遠通公司與中華電信等單位在臺灣館展示我國車聯網與 MaaS 等智慧運輸重要成果。



圖 2.13 遠通電收公司展示 ETC 電子收費相關成果



圖 2.14 中華電信公司展示北北宜 MaaS 相關成果

自駕巴士相關技術是本次大會研討與技術展示的重點，以主辦國丹麥為例，在本次大會中即展示了首輛在丹麥試運行的自動駕駛電動接駁巴士，該自

動駕駛電動巴士係由法國 NAVYA 公司製造(如圖 2.15)，在 2018 年春季與夏季間，於哥本哈根地區的 University Hospital of Zealand 進行 65 天的運轉測試，共計載運了超過 6,000 名的旅客，經查該路線主要在醫院通廊(hallway)中，全長共 400 公尺，每天運行 8 小時，在 6,449 名的被運送旅客中有超過 350 名行動不便人士搭乘，在 65 天的測試中，總共運轉了 842 公里。所使用的技術主要為影像辨識，屬於室內封閉場域內的 SAE level3 測試。



圖 2.15 哥本哈根地區的測試之法國 NAVYA 公司自駕巴士



圖 2.16 法國 NAVYA 公司自動駕駛計程車

事實上法國 NAVYA 公司製造的自駕巴士，不僅可應用在室內封閉場域，在今年大會的技術展示上更以藍色計程車、白色自駕巴士(如圖 2.16 與 2.17)款式展示在大會場域的接駁過程中，辨識障礙物之緊急剎停等相關功能，惟在所展示的車輛中，皆有人員在車上進行監控，屬於室外非封閉場域的 SAE level3 測試。



圖 2.17 大會周邊的接駁自動駕駛巴士



圖 2.18 德國 Ibeo Automotive Systemss 公司所展示的自駕車(1)

除了在車種上進行變換可以帶來不同體驗外，Ibeo Automotive Systems 公司所研發的自駕車另以叢林為主題，帶領乘客穿越不同佈景、遭遇不同動物(如老虎)來體驗自動駕駛巴士在不同站間的接駁體驗(如圖 2.18~2.20)。



圖 2.19 德國 Ibeo Automotive Systemss 公司所展示的自駕車(2)





圖 2. 22 REJSEPLANEN 公司 CEO Christina Hvid 簡報 APP 發展概況(1)

資料來源: Christina Hvid, CEO, Rejseplanen A/S–ITSWC 2018

在大會今年研討的場次中，開發 REJSEPLANEN APP 的公司 CEO Christina Hvid 特別說明(如圖 2.22~2.25)此款目前在丹麥地區市佔率極高的 MaaS App 相關資料，例如 90%的丹麥人聽過 REJSEPLANEN APP、75%的丹麥人用過 REJSEPLANEN APP、下載次數 370 萬次(另查丹麥人口近 600 萬人)、每月超過 3,500 萬次數的旅次查詢紀錄(85%的查詢紀錄來自手機裝置)以及提供包含 Google、Apple、Baidu 和微軟等超過 500 家企業的開放資料介接服務。

## Right now

- 90% of Danes know Rejseplanen
- 75% of Danes use Rejseplanen
- 3.7 mill downloads of Rejseplanen's apps
- 35+ mill requests for journeys a month. (85% from mobile phone)
- 500+ companies receive open data from Rejseplanen (among them Google, Apple, Baidu and Microsoft)

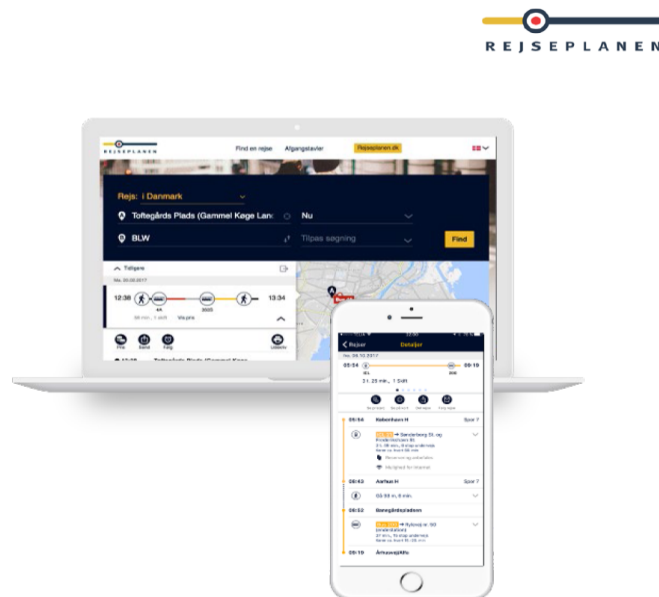


圖 2. 23 REJSEPLANEN 公司 CEO Christina Hvid 簡報 APP 發展概況(2)

資料來源: Christina Hvid, CEO, Rejseplanen A/S–ITSWC 2018

## Digital ticket i MaaS app for ITSWC2018

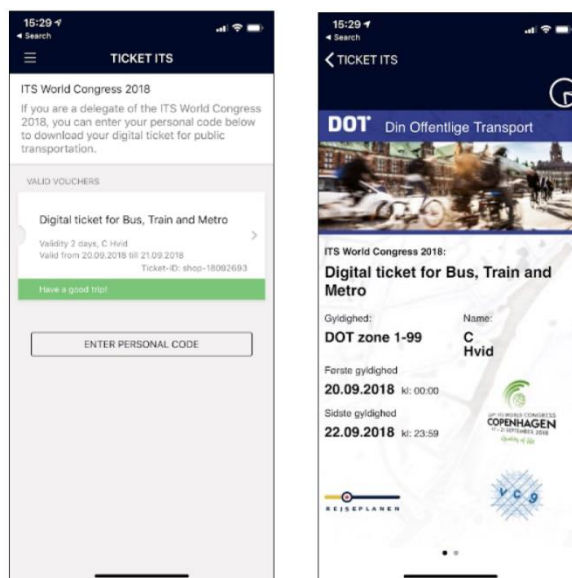


圖 2. 24 REJSEPLANEN 公司 CEO Christina Hvid 簡報 APP 發展概況(3)

資料來源: Christina Hvid, CEO, Rejseplanen A/S–ITSWC 2018

事實上丹麥的 REJSEPLANEN APP 在 2017 年的調查中，除了臉書以及其他行動支付 APP 外，在市佔率的調查中佔丹麥全國前五名，顯示該 App 不僅提供高佔比的使用族群更新更簡單的資訊流與金流整合服務，未來更有利相關單位利用該 App 數據為導向的服務優化與策略研擬方向。

## In the top 5 in Denmark



Source: Audience Project september 2017

圖 2. 25 REJSEPLANEN 公司 CEO Christina Hvid 簡報 APP 發展概況(4)

資料來源: Christina Hvid, CEO, Rejseplanen A/S–ITSWC 2018

### 2.3 ITS 年會研討場次摘述

本節主要摘述之場次，主要考量交通部運輸研究所刻正在高雄都會區推動 Mobility as a Service(MaaS)先導計畫，以加工區上班族與大學生的等通勤通學為主要目標族群，整合包含公車、捷運、輕軌、共享單車與計程車等金流與資訊流服務，為了解國際間在 MaaS 行銷手法、運具組合與推動策略以作為我國發展之參考，本節特別針對刻正推動 MaaS 發展的北歐芬蘭與瑞典、西歐德國與法國、南半球的澳洲與紐西蘭等國家在本屆大會中的 MaaS 演討場次進行摘述與研析。



圖 2. 26 MaaS Ecosystems in the Nordics(1)

資料來源: Göran Smith , Chalmers University –ITSWC 2018

目前許多歐美先進國家間都正在如火如荼的發展跨運具資訊流與金流整合支付工具，其核心概念 MaaS(Mobility as a Service)起源地即為北歐國家(除了本次大會主辦國丹麥外，芬蘭與瑞典兩國為推動主力國家)，因此在本次大會中位於瑞典第二大城哥德堡的 CHALMERS 大學 Mr. Goran Smith 特別在大會中以「MaaS Ecosystems in the Nordics」為題(如圖 2.26 與 2.27)，說明北歐各國目前發展 MaaS 的趨勢與生態系。



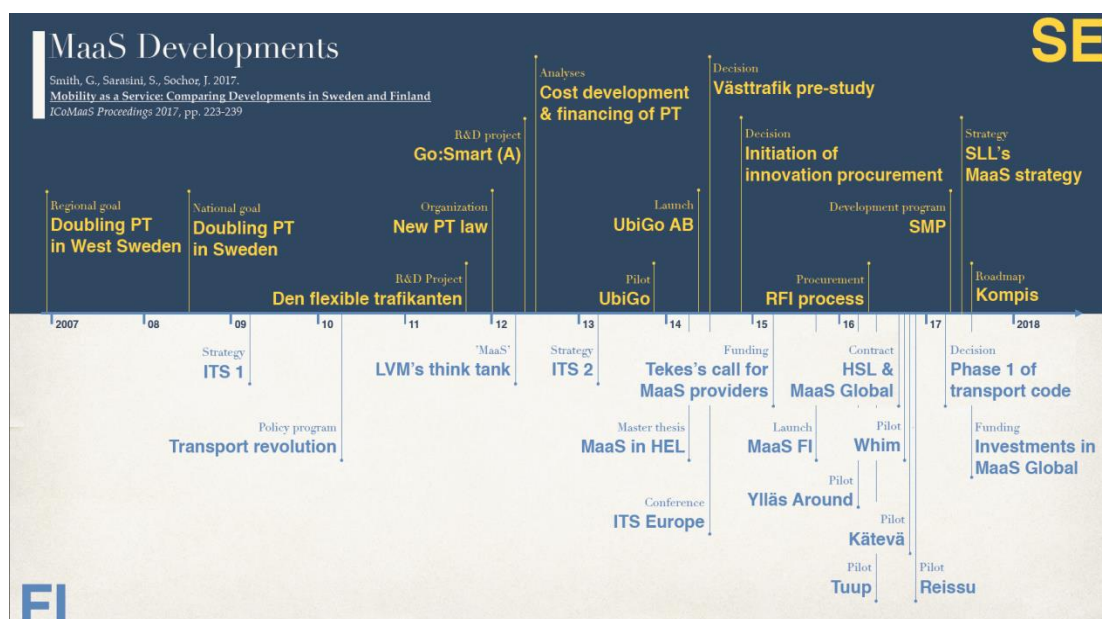


圖 2. 27 MaaS Ecosystems in the Nordics(2)

資料來源: Göran Smith , Chalmers University –ITSWC 2018

以瑞典目前發展的 MaaS APP UbiGO 為例，由圖中可清楚呈現 UbiGO 在 2013-2014 年開始試驗前便有相關研發計畫，而芬蘭的 MaaS APP Whim 在 2016-2017 年於芬蘭各地包含赫爾辛基與 Ylläs 等地的試驗計畫前也有相關的研發計畫與國際會議討論，直至今(2018)年 MaaS Global 公司逐漸打出國際市場，在英國伯明罕與荷蘭等城市複製芬蘭經驗。



圖 2. 28 MaaS From Hype to Delivery-MaaS Alliance(1)

資料來源: Piia Karjalainen MaaS Alliance, ERTICO –ITSWC 2018

# “MOBILITY AS A SERVICE” IN GOOGLE SEARCH (1/1/2013 - 31/8/2018)

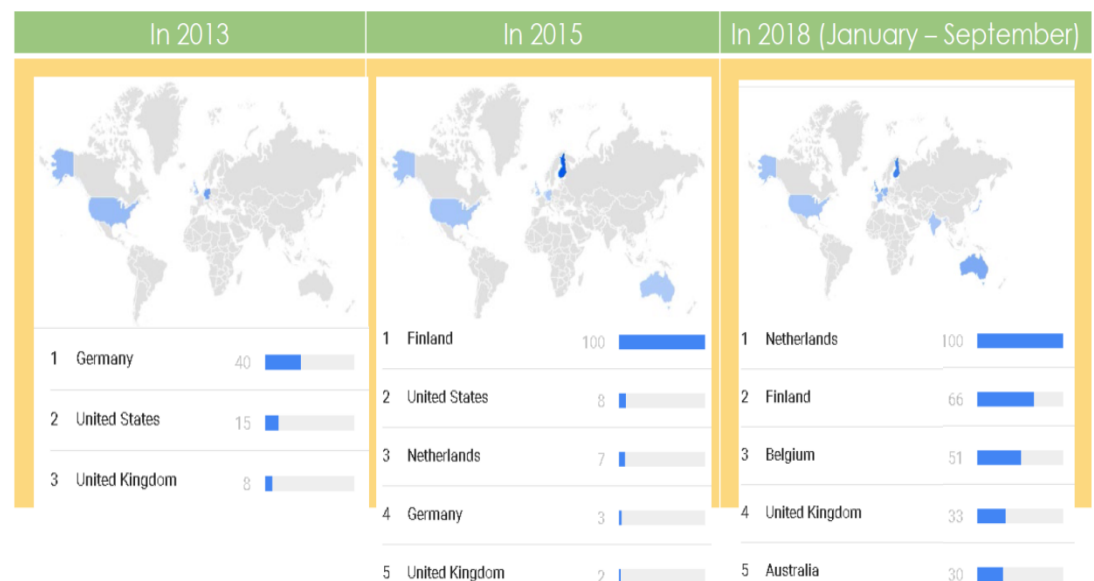


圖 2. 29 MaaS From Hype to Delivery-MaaS Alliance(2)

資料來源: Piia Karjalainen MaaS Alliance, ERTICO –ITSWC 2018

事實上 MaaS 在歐美各先進國家間的推動熱潮，從網路搜尋引擎的紀錄比數即可洞見，歐洲 ITS 協會 MaaS 策略聯盟的 Mr. Piia Karjalainen 特別列出 2013 年至 2018 年各國在 Google search 上的搜尋熱度(如圖 2.29 與 2.30)，由 2015 年的芬蘭，再到 2018 年 1 至 9 月逐漸擴張到荷蘭、比利時、英國與澳洲等國。

## MARKET POTENTIAL ESTIMATIONS

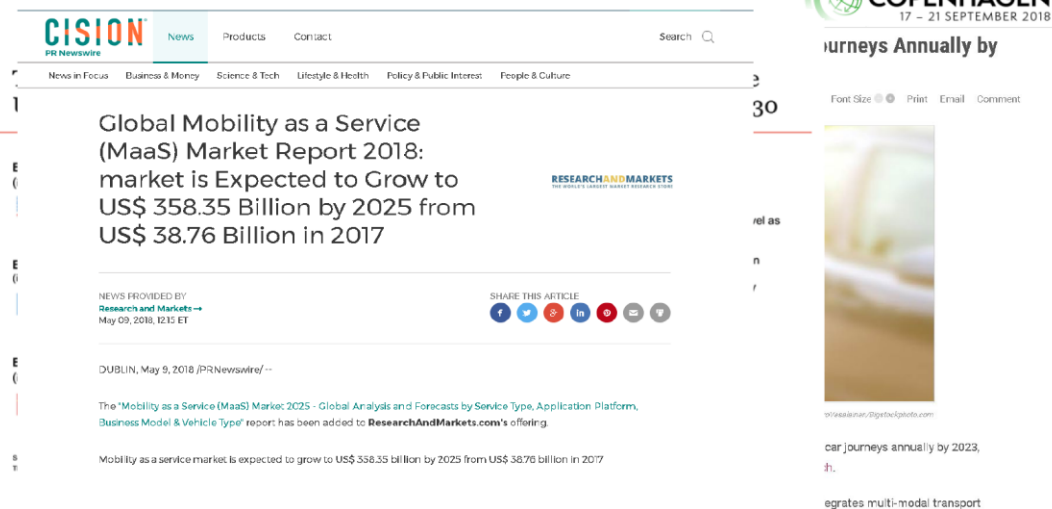


圖 2. 30 MaaS From Hype to Delivery-MaaS Alliance(3)

資料來源: Piia Karjalainen MaaS Alliance, ERTICO –ITSWC 2018



SIS26: Intelligent Operation models for Mobility-as-a-Service

Andy Taylor – Director of Strategy

September 2018

圖 2.31 「Multimodal MaaS Operational System」(1)

資料來源: Andy Taylor , Director of Strategy of Cubic –ITSWC 2018

除了沒有手機、無銀行帳戶以及觀光客等特殊族群，MaaS 概念在各國城市間對於運輸系統的整合具有高度影響力，MaaS operator 不僅可以整合顧客關係管理系統，更可以同步所有不同運具的旅遊資料來促進未來的規畫與管理決策，美國加州的 Cubic 公司 Mr. Andy Taylor 特別以「Multimodal MaaS Operational System」為主題，勾勒出過去傳統運輸系統與 MaaS operator 在運輸系統之資訊傳遞、資料分析與旅運規劃上的概念架構(如圖 2.31~圖 2.33)。

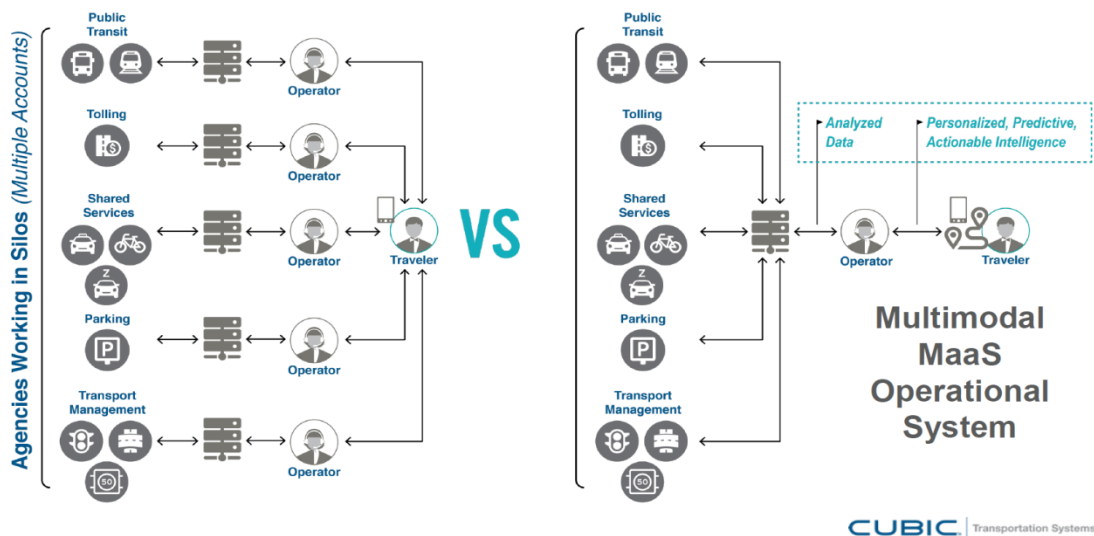


圖 2.32 「Multimodal MaaS Operational System」(2)

資料來源: Andy Taylor , Director of Strategy of Cubic –ITSWC 2018

# INTEGRATION LEVELS



J. Sochor, H.Arby, S.Sarasini, J.Karlsson, P.E.Holmberg, 2017, "A Topological Approach to Mobility as a Service: A Proposed Tool for Understanding Requirements and Effects, and for Aiding the Integration of Societal Goals,".

圖 2. 33 「Multimodal MaaS Operational System」 (3)

資料來源: Andy Taylor , Director of Strategy of Cubic –ITSWC 2018

圖 2. 34 MaaS 跨國合作試驗計畫「IMOVE」(1)

資料來源: Marco Boero, Softeco –ITSWC 2018

義大利軟體公司 Softeco 的 Mr. Marco Boero 先生在大會中特別介紹了另一個 MaaS 跨國合作試驗計畫「IMOVE」，主要以德國首都 Berlin、義大利北部大城 Turin 與英國大城 Manchester 進行 MaaS 概念的試驗計畫，以下將逐一介紹各國國際級城市的 MaaS 發展現況與推動方向(如圖 2.35~圖 2.38)。

# DEMONSTRATION SITES



- A mix of **transport environments**
  - metropolitan areas, mid-size urban areas, rural areas
- A **Living Lab** approach
  - involvement of local stakeholders
- **Roaming**
  - across sites/operators
- additional site selected via an **Open Call**

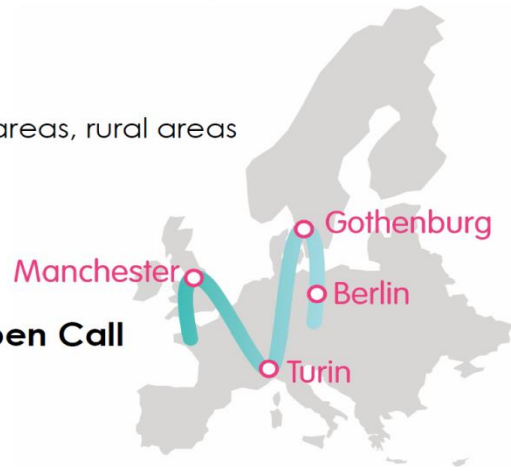


圖 2.35 MaaS 跨國合作試驗計畫「IMOVE」(1)  
資料來源: Marco Boero, Softeco –ITSWC 2018

## IMOVE LIVING LABS CHARACTERISTICS AND STATE OF PLAY



### Turin LL

**Building blocks:** urban area (0.9 million residents); MaaS developments since 2012, integrating: Public Transport, Bike Sharing, Traditional Car Sharing, Free Floating car sharing (Car2go), Electric car sharing (One Way), Carpooling (3 different operators to be integrated); integrated ticketing scheme (BIP);

**MaaS provider:** URBI (IMOVE partner)

#### Status

- Focus on home-2-work / work-2-work mobility
- Local stakeholders; selected (tender), GM, target users employees + Municipality / ST
- Strong role of PT (GTT), engagement of private MSP (car-/bike-sharing) ongoing



**MaaS integration level**  
current: L1  
target: L2



圖 2.36 MaaS 跨國合作試驗計畫「IMOVE」(2)  
資料來源: Marco Boero, Softeco –ITSWC 2018

義大利北部大城 Turin 在都市地區有 90 萬人口(整個大都會區約 220 萬人口)，自 2012 年便開始進行 MaaS 相關概念的整合，包含公共運輸、共享單車、共享汽車(Car2go)、電動共享汽車(One way)等，MaaS provider URBI 刻正推動以家-工作旅次以及工作-工作旅次的目標族群導向策略，主要以公共運輸為主，共享運具為輔的方向進行推動，期望未來能將 Turin 的 MaaS 自 Level 1 推向 Level 2。

# IMOVE LIVING LABS

## CHARACTERISTICS AND STATE OF PLAY



### Berlin LL

**Building blocks:** metropolitan/regional area (3.4 million inhabs.); multiple mobility services including PT (BVG), metro/train (U-Bahn, S-Bahn), stationery / free float car sharing (Cambio, Flinkster, Car2Go, DriveNow), bike sharing (Call-a-Bike, NextBike), scooter sharing (e-Mio, Coup Berlin); Taxi (MyTaxi); Uber;



**MaaS provider:** URBI (IMOVE partner), cooperation with VBB (access to payment services)

**MaaS integration level**  
current: L1  
target: L3

#### Status

- Phase 1: integration of at least one MSP per transport mode; taxi services not yet available (agreements ongoing)
- Phase 2: include all MSPs, covering all above modes
- Cooperation with VBB: adaptation of APIs of integrated ticketing system, allows reselling of PT tickets in the whole BB area



圖 2. 37 MaaS 跨國合作試驗計畫「IMOVE」(2)

資料來源: Marco Boero, Softeco –ITSWC 2018

德國首都 Berlin 首都大都會區約有 340 萬人口，運具相當多元包含公車、捷運、輕軌、火車、共享單車(Call-aBike)、共享汽車(Car2go)、電動共享機車(e-Mio)、計程車等，MaaS provider URBI 第一階段將整合所有公共運輸，第二階段將以整合所有公共運輸與共享運具為目標，期望未來能將 Berlin 的 MaaS 自 Level 1 推向 Level 3。

# IMOVE LIVING LABS

## CHARACTERISTICS AND STATE OF PLAY



### Greater Manchester LL

**Building blocks:** metropolitan area (2.7 million residents); intercity and international (cross-border) trips; combined mobility schemes integrating light rail tram system (Metrolink), buses for key transport interchanges (Metros Shuttle), bus network, taxi and private hire vehicle journeys, GM car club operator, public sector fleet; My GetMeThere smart card (light rail, tram, bus) to be extended to other modes; Travelspirit community for MaaS development.



**MaaS provider:** Fluidtime MaaS platform (market selection); different business models under evaluation

**MaaS integration level**  
current: L0  
target: L3

#### Status

- Acquisition of MaaS operation technology (Fluidtime)
- Several focus groups with local stakeholders (MSPs, users)
- Analysis of potentially applicable business models (role of public vs private)
- Start testing in 2nd iteration (from L0 to L1 first)



圖 2. 38 MaaS 跨國合作試驗計畫「IMOVE」(3)

資料來源: Marco Boero, Softeco –ITSWC 2018

英國大城 Manchester 大都會區約有 270 萬人口，運具相當多元包含公車 (Metroshuttle)、捷運、輕軌、火車、共享汽車、目前有 GetMeThere 智慧票證卡整合輕軌與公車等，MaaS provider Fluidtime，期望未來能將 Manchester 的 MaaS 自 Level 0 推向 Level 3。



圖 2.39 「MaaS4EU」歐洲 MaaS 跨國合作試驗計畫(1)

資料來源: Akrivi Vivian Kioussi, INTRASOFT –ITSWC 2018

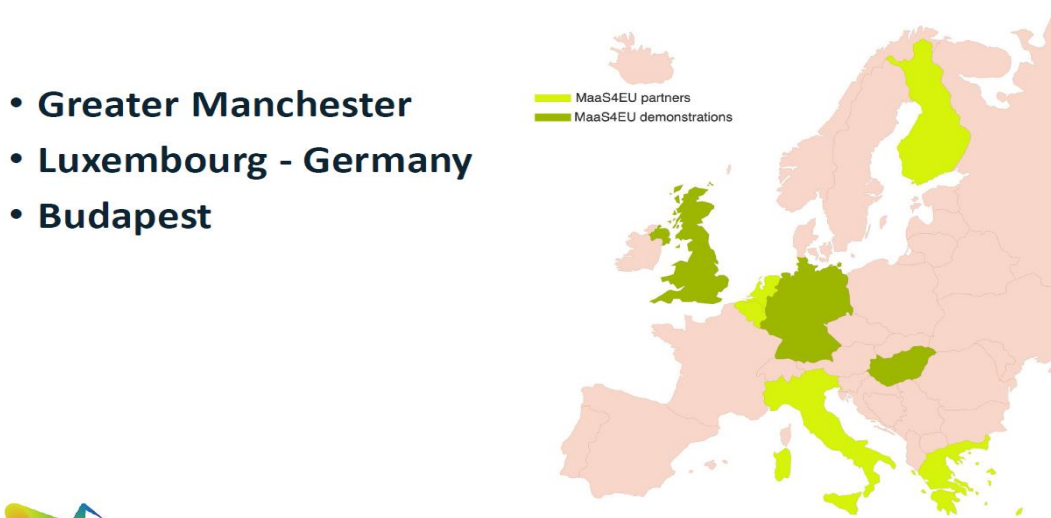
「MaaS4EU」為另一個與「IMOVE」類似的歐洲 MaaS 跨國合作試驗計畫，總部位於盧森堡的 INTRASOFT 公司 Mr. Akrivi Vivian Kioussi 在大會中簡報了該公司主導、協同英國倫敦大學學院(UCL)、大曼徹斯特交通局、布達佩斯交通局與芬蘭 MaaS Global 等公私部門在三個主要城市進行歐洲 MaaS 跨國試驗計畫。

## MaaS4EU Partners



圖 2.40 「MaaS4EU」歐洲 MaaS 跨國合作試驗計畫(2)  
資料來源: Akriki Vivian Kioussi, INTRASOFT –ITSWC 2018

## MaaS4EU Demonstration Areas



- Greater Manchester
- Luxembourg - Germany
- Budapest

圖 2.41 「MaaS4EU」歐洲 MaaS 跨國合作試驗計畫(3)  
資料來源: Akriki Vivian Kioussi, INTRASOFT –ITSWC 2018

如圖所示，「MaaS4EU」成員主要來自芬蘭、盧森堡與義大利等國，試驗場域涵蓋不同型態的 MaaS 商業模式與產品，包含英國中部大城 Great Manchester 的都會區與城際旅次(當地旅客與觀光客)、西歐盧森堡至德國的都會區與跨境旅次(以當地旅客為主)、東歐布達佩的都會區與跨境旅次(當地旅客與觀光客)。



## Different MaaS business models and products



圖 2.42 「MaaS4EU」歐洲 MaaS 跨國合作試驗計畫(4)  
 資料來源: Akrivi Vivian Kioussi, INTRASOFT –ITSWC 2018

## MaaS4EU definition for MaaS

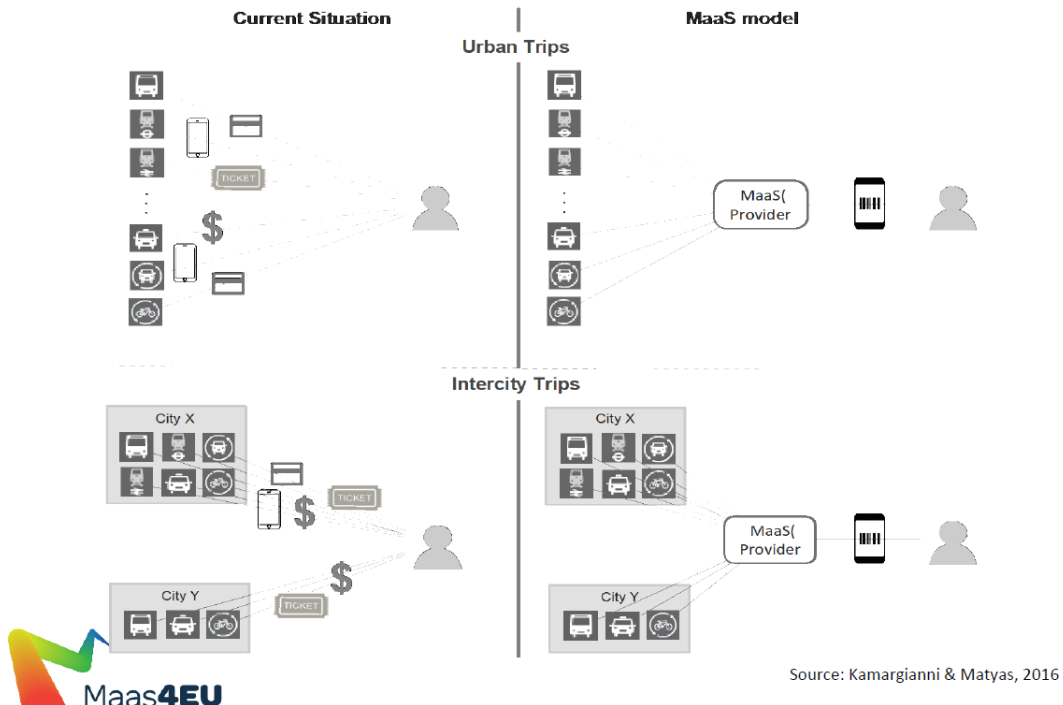


圖 2.43 「MaaS4EU」歐洲 MaaS 跨國合作試驗計畫(5)  
 資料來源: Akrivi Vivian Kioussi, INTRASOFT –ITSWC 2018

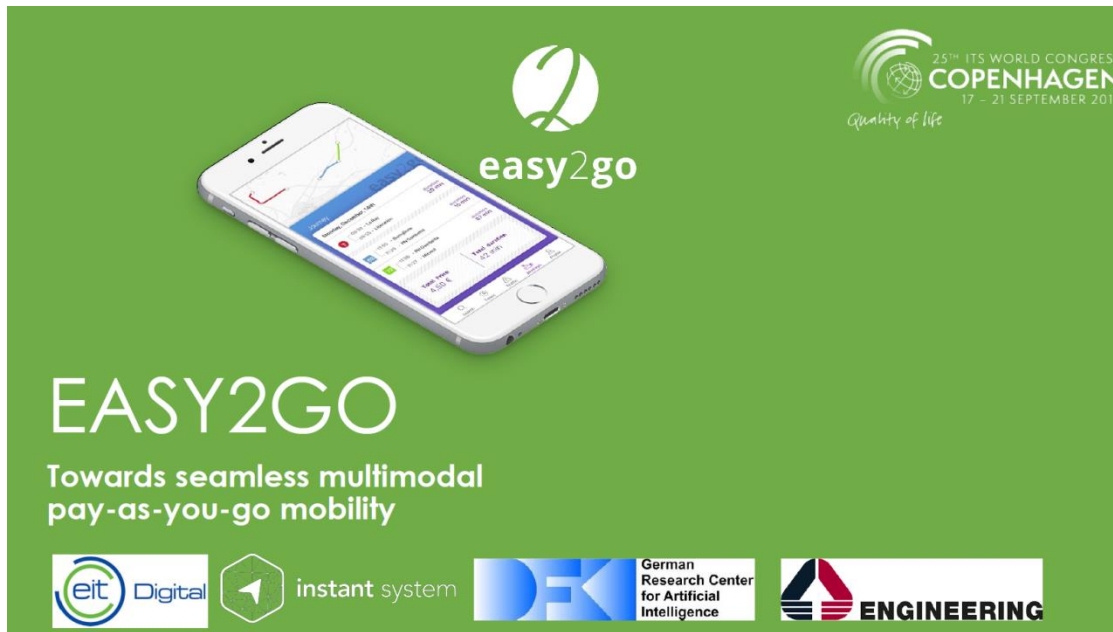


圖 2.44 法國 MaaS 計畫 EASY2GO(1)

資料來源: Stéphane Péan, EIT Digital –ITSWC 2018

西歐法國也刻正推動 MaaS 試驗計畫，歐洲創新研究院(European institute for Innovation and Technologies)為了促進數位轉型，透過教育、研究與商業手段提出數位創新的方案，其中特別在 2018 年以 MaaS 概念，在法國各重要城市協助打造通勤族進行多運具無縫轉乘之電子支付套案 EASY2GO，如圖 2.45 所示

## THE SUPPORT OF EIT DIGITAL



### WHAT ?

A community (KIC) on behalf of the **European institute for Innovation and Technologies (EIT)**

### WHY ?

Driving Europe's **digital transformation** through Education, Research and Business (ERB)

### HOW?

Delivering **breakthrough digital innovations** (open-innovation) **to the market** with economic and societal **impacts**

圖 2.45 法國 MaaS 計畫 EASY2GO(2)

資料來源: Stéphane Péan, EIT Digital –ITSWC 2018

# TRIP MODE RECONSTRUCTION MODULE



Technology based on **smartphone sensors**

An **SDK for check-in / be-out** ticketing (% error → assisted)

Enabling the **reconstruction of the route** done by the traveller

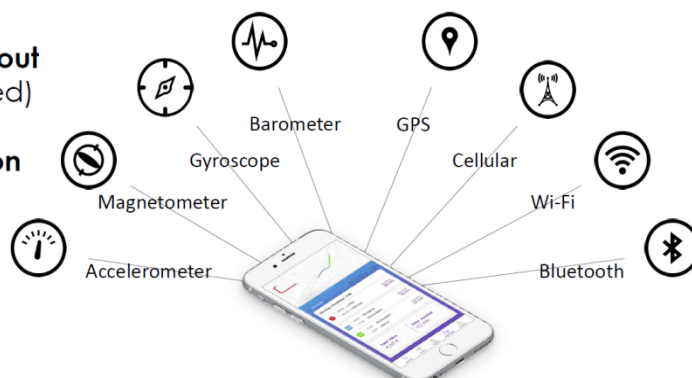


圖 2.46 法國 MaaS 計畫 EASY2GO(3)

資料來源: Stéphane Péan, EIT Digital –ITSWC 2018

EasytoGo 主要提供通勤者起迄點旅次的運具推薦、旅運規畫與個人化行動秘書的警示服務，EASY2GO 除了提供 App 為基礎的更透過 App 全程收集有用之旅運資料，並透過手機上各項物聯網設備所蒐集的資料建立旅次鏈重建模組 (Trip mode reconstruction module)，除了提供使用者資訊外，亦大量蒐集旅運者產生之大量高價值資料(如圖 2.46~2.47 所示)

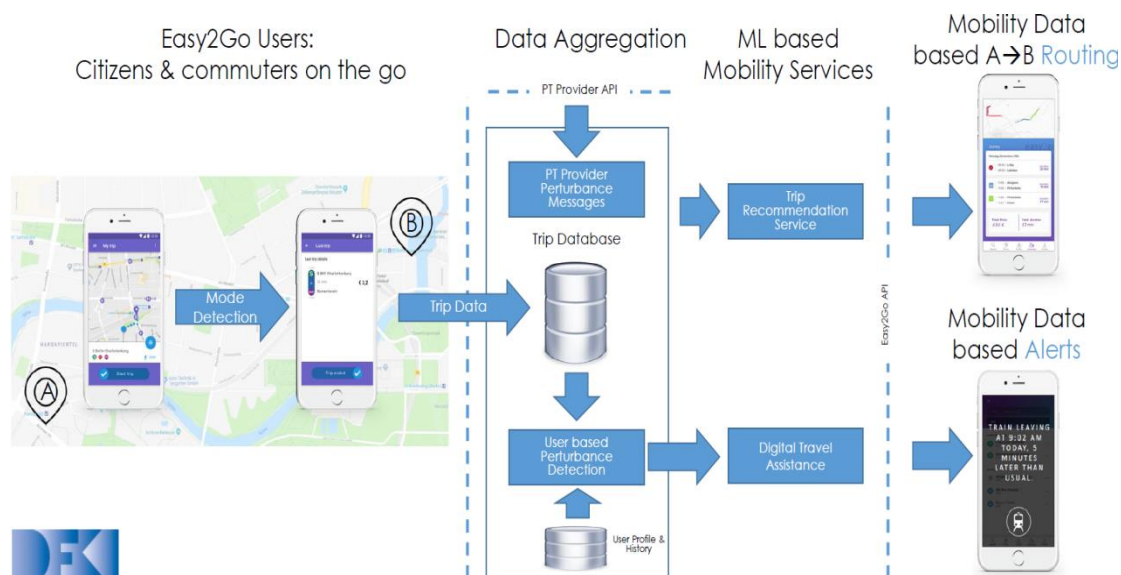


圖 2.47 法國 MaaS 計畫 EASY2GO(4)

資料來源: Stéphane Péan, EIT Digital –ITSWC 2018

## EASY2GO SYNOPSIS

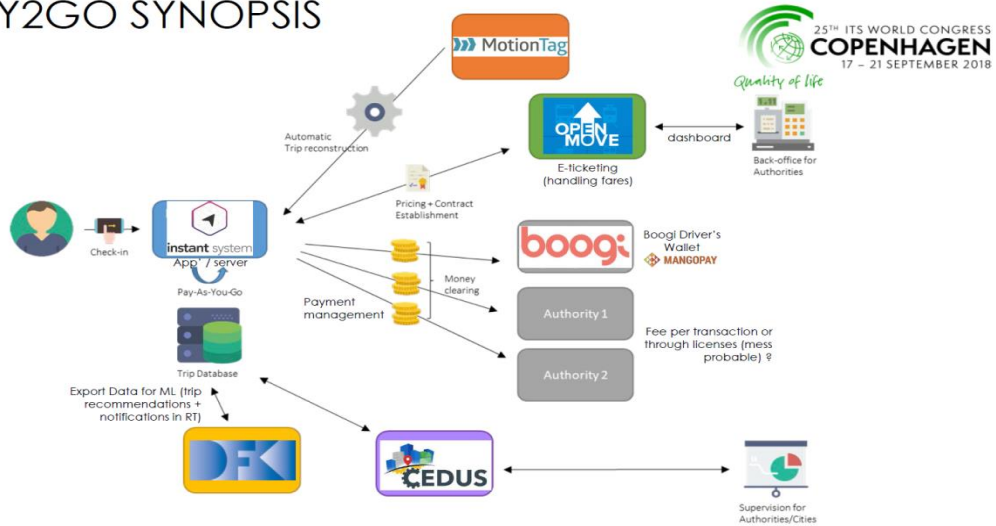


圖 2. 48 法國 MaaS 計畫 EASY2GO(5)

資料來源: Stéphane Péan, EIT Digital –ITSWC 2018

該套案並非如芬蘭 MaaS Global 或臺灣高雄推動之 Mingo 卡主流推動的月票(Monthly plan)套案服務，而是透過使用者運用手機登入 APP 的方式進出整合型之運輸系統，以不同資訊流與金流單位之資料共享與金流拆分方式，每日結算當日運輸系統使用費之旅次計價方案(Pay-as-you-go)，目前在法國主要城市包含 Bordeaux, Nice, Strasbourg 等城市，目前約有 1 萬名用戶，主要以大眾運輸整合短距離的共享汽車服務為主(如圖 2.48 所示)。

## Mobility as a Service in Australia: Customer insights and opportunities

September 2018

Stacey Ryan

Policy Manager  
ITS Australia

itsaustralia  
Intelligent Transport Systems



圖 2. 49 「Mobility as a Service in Australia」 (1)

資料來源: Stacey, Ryan –ITS Australia

南半球大國澳洲在本次 ITS 世界年會中，也充分展現該國未來推動 Mobility as a Service 的構想與思維，澳洲 ITS 協會(ITS Australia)Policy Manager Ms. Stacey Ryan 在本次大會中揭示了澳洲在推動 Mobility as a Service 前所進行的各項前期研究，以針對 Mobility as a Service 未來在澳洲市場的推動機會與可行性進行深入分析，該研究專案主要由澳洲 ITS 協會、新南斯威爾州交通署、昆士蘭州交通署、維多莉亞州交通署、南澳大學、CUBIC 公司等產官學研單位共同推動。



圖 2. 50 「Mobility as a Service in Australia」(2)

資料來源: Stacey, Ryan –ITS Australia

澳洲 ITS 協會在「Mobility as a Service in Australia: Customer insights and opportunity」此計畫中，對國際間各大城市刻正推動的 MaaS 專案與所發展的 APP 進行觀察，以做為未來澳洲市場推動 MaaS 之參考，以下茲針對澳洲 ITS 協會對於先進各國 MaaS 相關專案(芬蘭、德國、奧地利與紐西蘭)的分析進行摘述：

## Sample of MaaS Worldwide

1. Service region
2. Modes offered
3. Planning
4. Booking
5. Payment model
6. Governance



UbiGo | Whim | Moovel | WienMobil | EMMA | Mobility Shop | HelloGo | Didi | myCicero | PostBus | Choice | Ride Mate

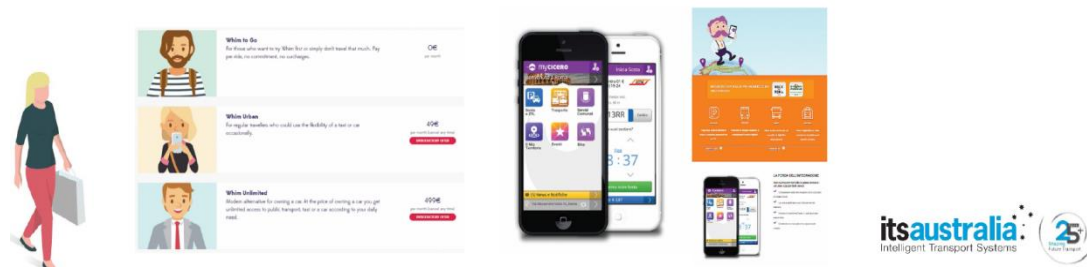


圖 2.51 「Mobility as a Service in Australia」(3)

資料來源: Stacey, Ryan –ITS Australia

Whim 為 MaaS Global 公司，以芬蘭首都 Heksinki 為基地，在 2016 所推出整合大眾運輸、計程車與每日租車服務，未來將再納入共享單車與共享汽車服務，目前共有 pay-as-you-go(旅次計價)、每月 49 歐元(大眾運輸免費無限次數搭乘，租車與計程車優惠計價)、每月 499 歐元(所有運具無限次數搭乘)三種方案。

## Whim

Whim is a full service commercially available MaaS system that was launched in Helsinki, Finland in 2016. Whim uses a smartphone app that allows customers in the Helsinki metropolitan region access to local public transport, taxi and daily car rental services, with access to car-share and bike-share services expected to be added soon. Since its launch, Whim has commenced operations in the West Midlands, UK. The service is currently being trialled in Greater Amsterdam in the Netherlands and the Antwerp region in Belgium. The intent is to be a global MaaS provider. The company website states that “negotiations are ongoing in Austria, Canada, Singapore, and several other markets”.

Whim has an integrated ticketing and payment system and a personalized journey planner. Whim currently offers three payment plans. The first is a pay-as-you-go plan that charges customers market prices for access to each of the available transport modes, with no commitment or surcharges. The plan is targeted at new customers who wish to trial the service, and customers who don't travel much. The second plan offers a monthly subscription at €49 per month (\$75.00), and provides unlimited access to local public transport and

discounted rates for taxi and daily car rental services. The plan is targeted at travellers who frequently use alternative modes of transport, and depend on private car access only occasionally. The third plan offers a monthly subscription at €499 per month (\$767.00) and provides unlimited access to all available transport modes. The plan is marketed as a “modern alternative for owning a car” and is targeted at travellers who depend on private car access to fulfil most of their mobility needs, but do not wish to own a car.

The development of Whim has been led by the private sector. The service is operated by MaaS Global, a private company based in Helsinki. However, MaaS has enjoyed great support from the public sector in Finland. For example, Sonja Heikkilä's 2014 thesis, the first formal introduction of the concept of MaaS and its ability to reorganize the passenger transport sector, was commissioned by the Helsinki City Planning Department. The Finnish Transport Agency has continued to support the delivery of local MaaS solutions through the creation of appropriate national policies and strategies, investments in the necessary infrastructure, and the adoption of an open data policy.

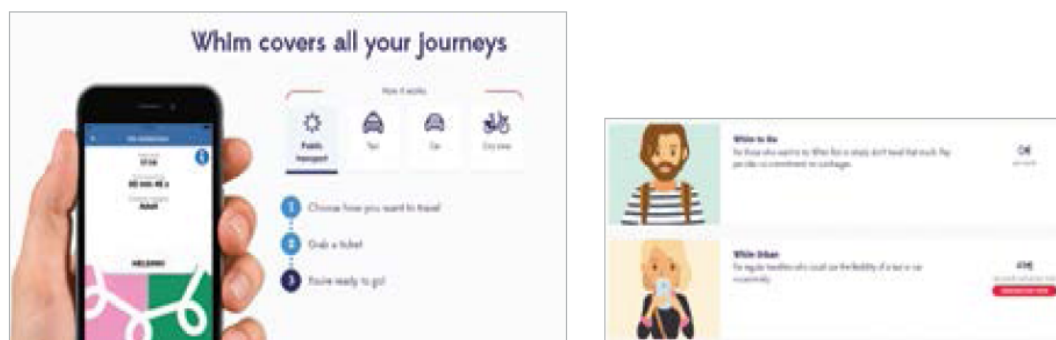


圖 2. 52 「Mobility as a Service in Australia」(4)

資料來源: Stacey, Ryan –ITS Australia

Moovel 是德國目前在 Stuttgart、Hamburg、Karsruhe 等重要城市推動的

MaaS 營運系統，主要由汽車製造商 Daimler 公司推動，可讓使用者運用 Moovel 搭乘 Car2go 共享汽車、共享單車、計程車與鐵路運輸服務，Moovel 目前僅提供 pay-as-you-go(旅次計價)服務。目前在上開城市中該 App 同時具有整合式票證支付與個人化旅運規劃功能，另外在其他歐美城市則提供個人化旅運規劃功能。

### Moovel

Moovel is a full service commercially available MaaS system in Germany. Moovel uses a smartphone app that allows customers in Germany access to car2go, a national car-share service; mytaxi, a national taxi service; Deutsche Bahn, the German national rail service provider; and selected bike-share services. In the cities of Stuttgart and Hamburg, customers also have access to local public transport services through Moovel. The service has an integrated ticketing and payment system and a personalized journey planner. The service currently offers a single pay-as-you-go payment plan with no registration fees that provides access to all available services.

The personalized journey planner is available as a standalone app by the same name in selected cities in Europe, North America, Asia and Australia. Moovel aims to be a global MaaS provider. As per their webpage, Moovel is trialing their MaaS systems currently in three American cities: Austin, Boston and Portland. Moovel also provides their digital platform to host MaaS systems in other places. For example, the Karlsruhe Transport Association, which oversees the management of public transport systems and services in Karlsruhe, Germany,

uses the Moovel platform to host a MaaS system that is tailored to Karlsruhe, offered as a smartphone app by the name KVV.mobil. The system provides customers access to all local public transport services, local car-share services provided by the company stadtmobil, and local bike-share services provided by the company Fächerrad.

The development of Moovel has been led by the private sector. The company is owned by the auto manufacturer Daimler. It was created in 2016, as part of an industry wide trend that's seen other auto manufacturers like General Motors, Ford and BMW enter the mobility market as service providers as well. Moovel has experienced resistance from public transport agencies in many cities, out of fear that their business may be cannibalized by these new service providers (Muio, 2017). In the cities where the service has been able to persuade public transport agencies to come on board, Moovel has employed a symbiotic approach, where the service earns a cut from ticket sales made using the app, and the public transport agencies get access to Moovel's data on how customers are using the local transport system.



圖 2. 53 「Mobility as a Service in Australia」(5)

資料來源: Stacey, Ryan –ITS Australia



WienMobil 是奧地利目前在首都 Vienna 推動的 MaaS 營運系統，WienMobil 之推動公司為 Wiener Linien，為 Vienna 市政府所權管的公營公司，提供使用者運用 App 使用共享汽車、共享單車、計程車與公共運輸服務，WienMobil 主要整合過去 Vienna 地區既存的 qando 旅運規劃 app 與 Wiener 公共運輸訂票 app，WienMobil 目前僅提供 pay-as-you-go(旅次計價)服務。

### WienMobil

WienMobil is a full service commercially available MaaS system available in Vienna, Austria. WienMobil uses a smartphone app that offers customers access to local public transport, car-share, taxi, car park and bike-share services. It combines functionality from two previous public transport apps for customers in Vienna: qando, a public transport journey planner, and the Wiener Linien ticket app, for buying tickets to Vienna's local public transport system. The service emerged from an earlier prototype, called SMILE, that has been referenced by previous reviews.

With has an integrated ticketing and payment system, the service currently offers a single pay-as-you-go payment plan with no registration fees. However, the platform does require the user to register with the car-share and bike-share service providers separately, either through the WienMobil app or through their independent platforms. Registration information may be stored in the app and used to book these mobility services.

It has a built-in multimodal journey planner that offers a greater degree of personalisation than other MaaS systems. For example, the app can store information about student passes, season tickets, discounts and memberships, and integrate them in its calculation of fares and fees for different routes. The journey planner allows customers to compare different modes for a given trip in terms of not just the time and cost that they incur, but also their environmental impact.

WienMobil has been developed by Wiener Linien, a public-sector company under control of the Vienna city government that runs the majority of the public transport network in Vienna. However, as noted previously, the service has been able to integrate transport services provided by multiple private companies.

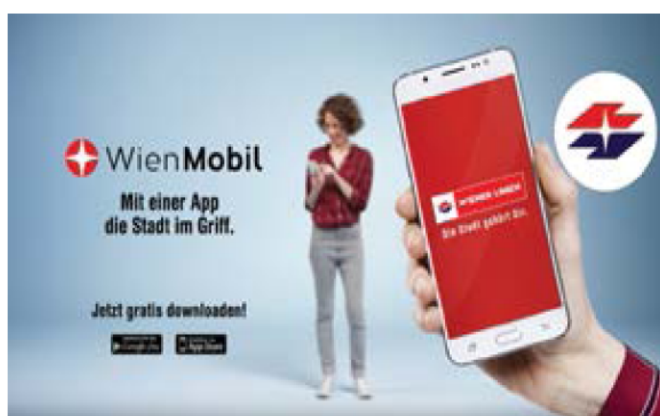


圖 2. 54 「Mobility as a Service in Australia」(6)

資料來源: Stacey, Ryan –ITS Australia

Choice 試驗計畫是紐西蘭政府目前在南島旅遊勝地 Queenstown 所推動的整合運輸服務，包含公共運輸、直升機、Uber 共享汽車與計程車等服務，另外紐西蘭政府另在北島最大城市 Auckland 進行 Ride Mate 試驗計畫，整合共享車、計程車與公共運輸服務，並提供點數累積與相關優惠來吸引新 app 使用者。

### Choice / Ride Mate

Choice is a Queenstown pilot developed by NZ government targeted to visitors in accessing information and booking transport between Queenstown airport, the city and ski areas. Includes public transport, private transport (e.g. helicopter bookings), taxi and ride-share (e.g. Uber).

Ride Mate is an Auckland pilot, also developed by NZ government which includes public transport, private transport (e.g. shuttles), taxi and ride-share (e.g. Uber) it includes the ability to offer in-app rewards and discounts allows mobility suppliers to reach new customers and enables data to be collected and used for transport planning.



圖 2. 55 「Mobility as a Service in Australia」(7)

資料來源: Stacey, Ryan –ITS Australia

紐西蘭交通署(New Zealand Transport Agency)在本次 ITS 大會中也特別針對 Choice 與 Ride Mate 的發展概念與使用介面進行簡介，如圖 2.56~2.58 所示。

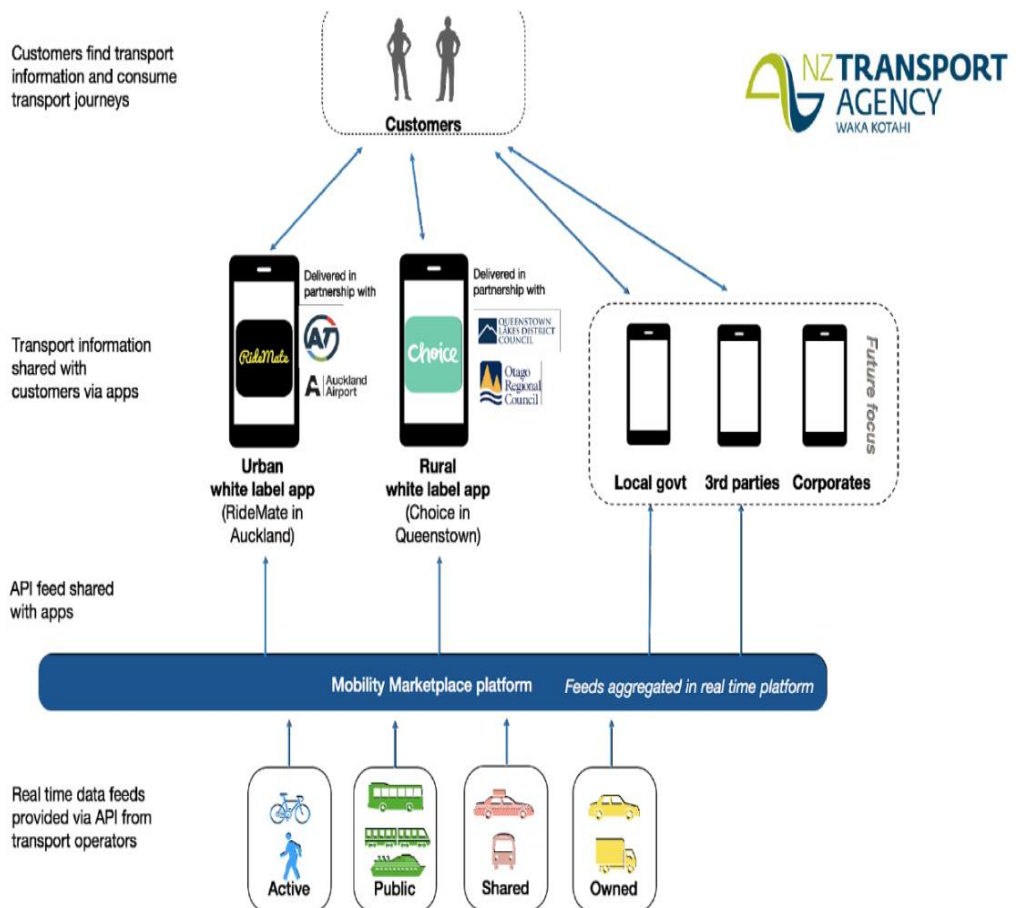


圖 2. 56 「Choice 與 Ride Mate 的發展概念與使用介面(1)  
資料來源:New Zealand Transport Agency –ITSWC 2018

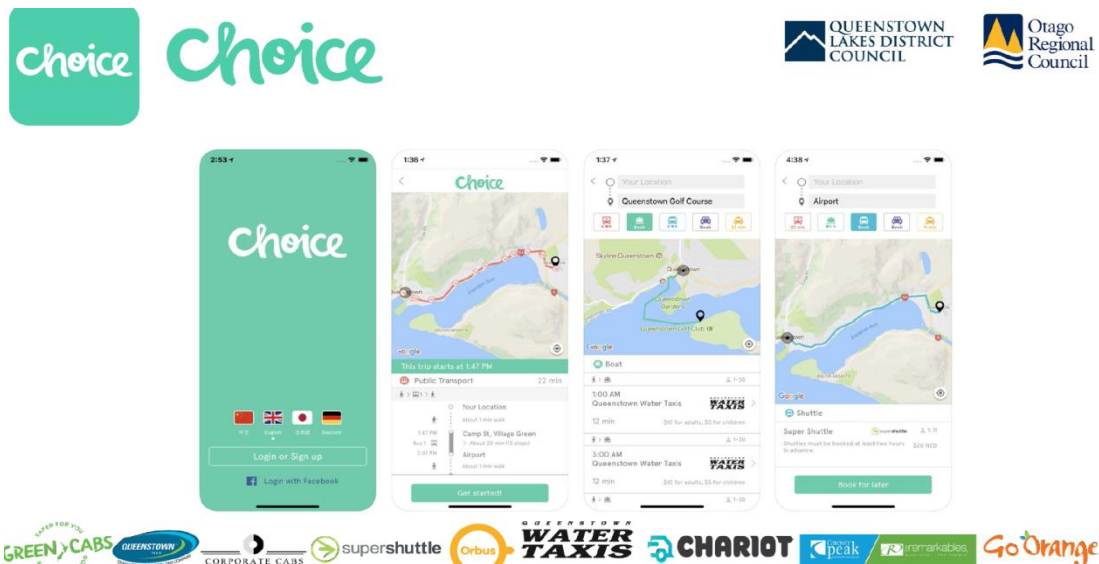


圖 2. 57 「Choice 與 Ride Mate 的發展概念與使用介面(2)  
資料來源:New Zealand Transport Agency –ITSWC 2018

# RideMate

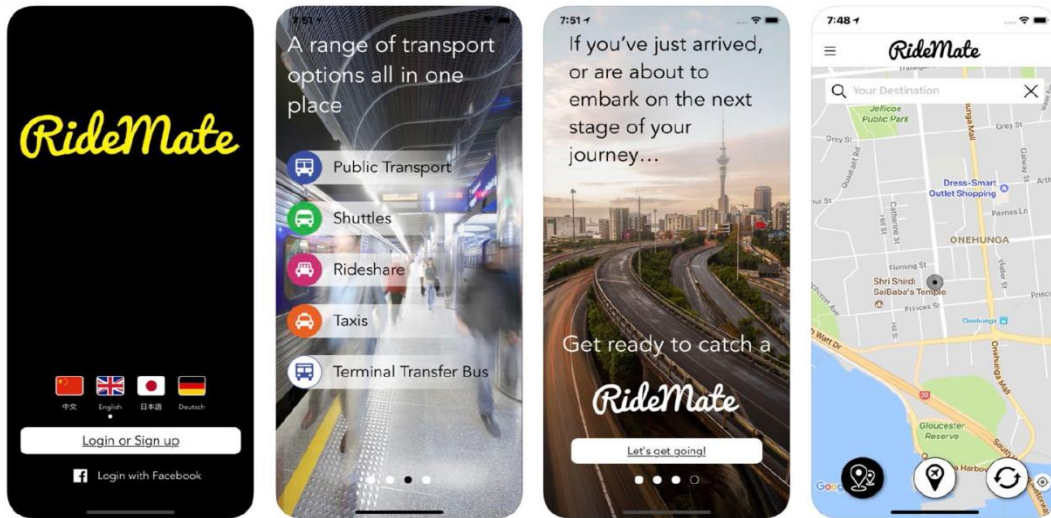


圖 2.58 「Choice 與 Ride Mate 的發展概念與使用介面(3)

資料來源:New Zealand Transport Agency –ITSWC 2018

## Mobility as a Service

### Research and Report – Project Goals

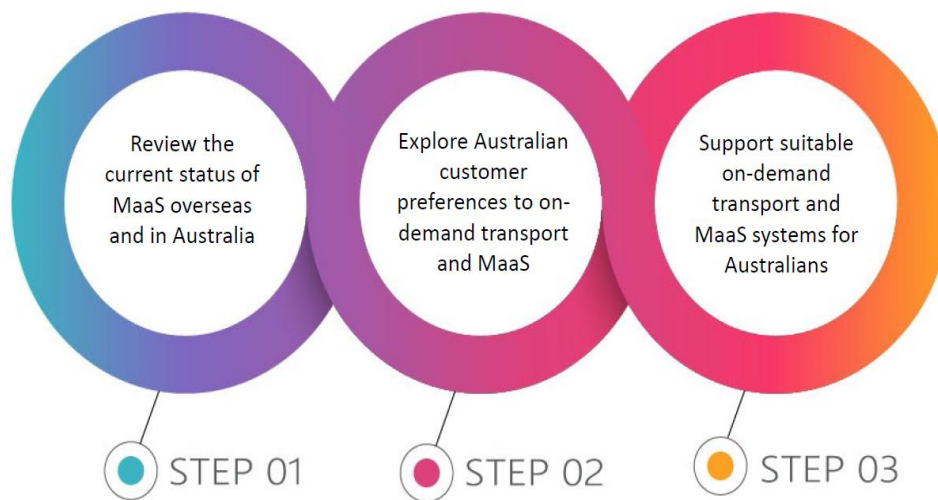


圖 2.59 「Mobility as a Service in Australia」(8)

資料來源: Stacey, Ryan –ITS Australia

由圖 2.59 可了解，澳洲 ITS 協會透過「Mobility as a Service in Australia:Customer insights and opportunity」此計畫，經過第一階段對上開包含芬蘭等國在國際間推動的 MaaS 專案發展現況進行回顧後，第二、三階段主要

探討澳洲人對於 MaaS 的使用者偏好與發展適合澳洲市場的 MaaS 營運模式。

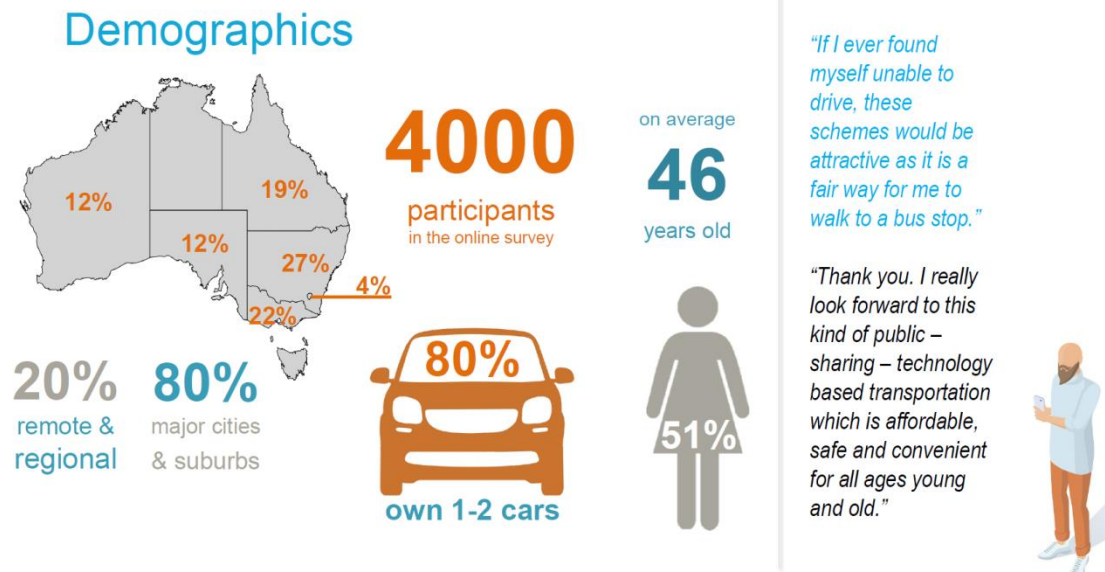


圖 2. 60 「Mobility as a Service in Australia」(9)

資料來源: Stacey, Ryan –ITS Australia

在該研究的問卷調查上，澳洲 ITS 協會對 4,000 名受訪者(受訪者基本特性為：平均年齡 46 歲，80%擁有 1-2 部車，男女比約各半，20%住在偏遠地區，80%住在都會區或市郊)的進行線上調查。



圖 2. 61 「Mobility as a Service in Australia」(10)

資料來源: Stacey, Ryan –ITS Australia

調查結果顯示，在 MaaS 運具組合上，澳洲居民最偏好納入當地公共運

輸，對共享單車最無興趣，而在金融支付套案上，Pay-as-you-go 的旅次計價模式受歡迎程度是無限暢遊月票制的兩倍，而在旅次目的上，41%澳洲居民會將 MaaS 服務用在社交活動(social activities)上，僅有 20%民眾會用 MaaS 來通勤或訪友，主要考量原因包含受訪者為私人車輛仍有高度無法替代的可及性。

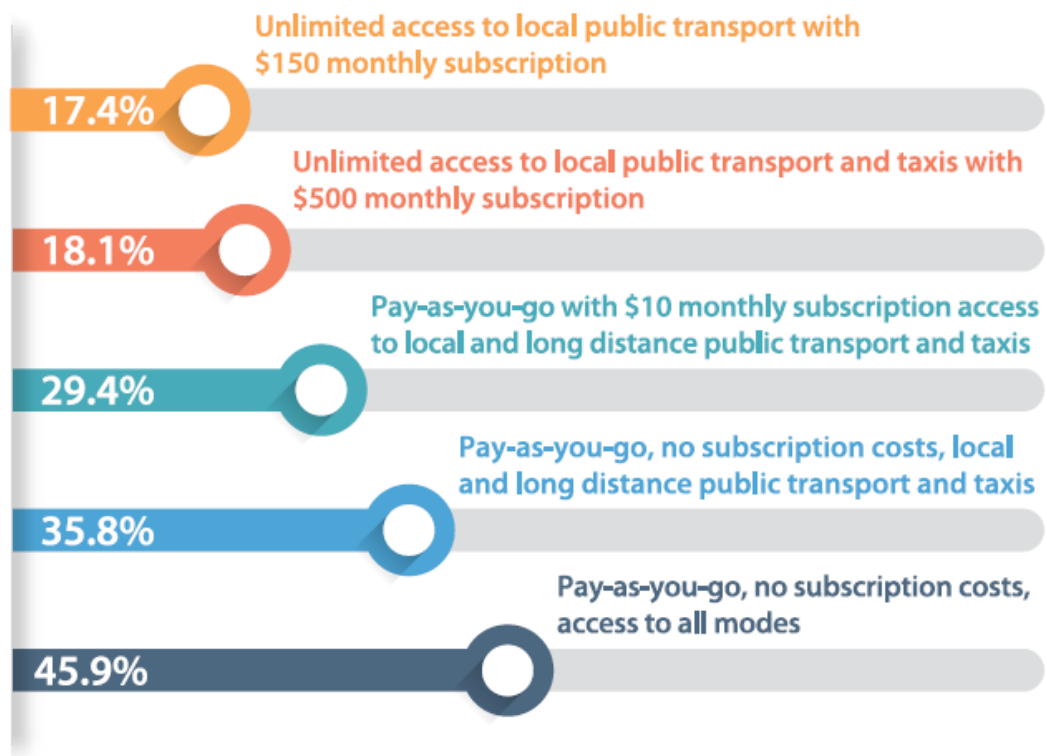


圖 2.62 「Mobility as a Service in Australia」(11)

資料來源: Stacey, Ryan –ITS Australia

如圖 2.62 所示，Pay-as-you-go 的服務模式受到澳洲人士購買的機率分別為：可使用所有運具 45%、僅使用大眾運輸與計程車 35%與需支付每月 10 澳幣(約臺幣 230 元)的訂購費 29%；而在無限暢遊服務模式上，受到澳洲人士購買的機率分別為：每月支付 150 元澳幣(約台幣 3,450 元)無限使用當地所有大眾運輸 17%，每月支付 500 元澳幣(約台幣 11,500 元)無限使用當地所有大眾運輸 18%，顯示 Pay-as-you-go 的三種服務模式皆遠較無限暢遊的兩種服務模式受到歡迎。

# Personas

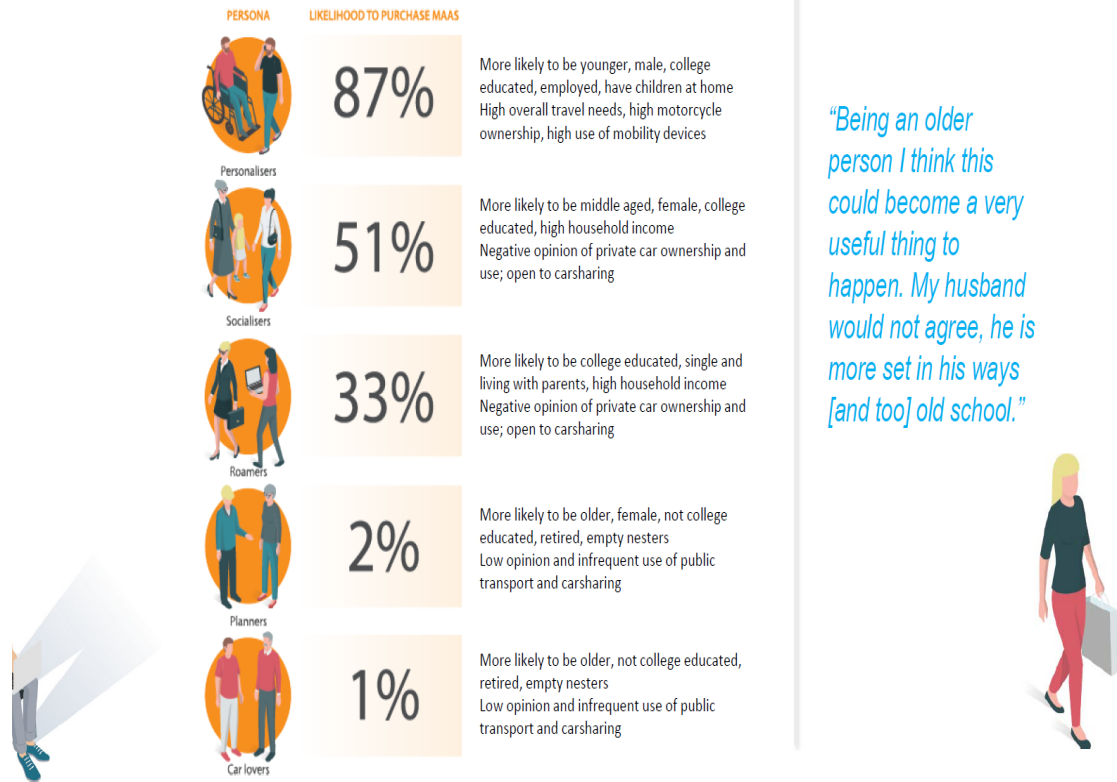


圖 2.63 「Mobility as a Service in Australia」(12)

資料來源: Stacey, Ryan –ITS Australia

在未來購買 MaaS 服務的潛力族群(如圖 2.63)上，該研究指出 87%的年輕單身族群有可能會購買，這類的單身族群特色為男性、大學程度教育、機車持有率高者、行動裝置重度使用者與高旅次需求族群；51%的中年單身族群有可能會購買，這類的單身族群特色為女性、大學程度教育、高家戶所得、對私人運具之持有保有負面看法與對共享汽車服務保有開放態度；33%的單身族群有可能會購買，這類的單身族群特色為與父母同住、大學程度教育、高家戶所得、對私人運具之持有保有負面看法與對共享汽車服務保有開放態度。

## 第三章 心得與建議

### 3.1 心得

- 1.丹麥哥本哈根為全球十大宜居城市，在公共運輸軟硬體建設上，到站資訊動態顯示具有高度跨具整合性與創意性，在人本交通發展上，強調公共運輸運具之設計舒適性與自行車道建設路網之完整性，輔以丹麥對於國民自幼教育提高日常自行車運具之使用，大幅提升丹麥首都整體的交通環境與城市宜居程度。
- 2.交通行動服務(MaaS)為世界先進各國推動交通資訊整合服務之發展趨勢，有別於過去的世界年會，對於 MaaS 著重於概念的探討與應用可行性研析，在本次大會所聆聽的場次中，國際間已將各政府或民間公司正在測試或實際營運的系統經驗於大會中進行闡述與說明，目前依據各 MaaS 系統在金融與資訊流的整合程度之不同，MaaS 系統可分為 5 級，自 0 級(無整合，各運輸系統分散管理現況)、1 級(僅運具資訊流與金融資訊之提供：如 Google)、2 級(單一運具金融與資訊整合)、3 級(跨運具金融與資訊整合)與 4 級(政策整合:政府監理與公司夥伴整合)。
- 3.澳洲為目前先進國家中尚未具有 MaaS 營運服務的國家之一，因此澳洲 ITS 協會特別透過「Mobility as a Service in Australia:Customer insights and opportunity」計畫，研析與收斂歐美各國 MaaS 專案推動型態與經驗，以瞭解未來澳洲市場推動 MaaS 之可行性，並透過市場分析上分析澳洲人士中購買 MaaS 服務的族群特色，如退休族群可能較不會購買 MaaS 服務，這類的退休族群特色為對公共運輸與共享汽車服務不具太多想法與使用經驗等，相關分析內容與結果，可做為我國刻正推動的兩大 MaaS 服務：北宜廊道發展的 Umaji 與高雄都會區的 Men go 服務在未來行銷策略與整體發展計畫方向上之參考。



## 3.2 建議

1. ITS 年會是國際間專業人士交流最新智慧運輸發展趨勢之會議，交通部運輸研究所長期扮演交通部智庫與國際合作交流之角色，參加 ITS 世界年會不僅可掌握先進交通運輸之發展動向，更可擴展國家公務人員前瞻創新之視野與磨鍊國際場合所需之外語與專業能力，建議本所在經費編列允許下，每年鼓勵同仁參與 ITS 年會此一年度國際盛事，俾利與世界先進各國產官學研人員持續互動。
2. 依據全球交通行動服務 2018 年報告(Global MaaS Report 2018)顯示，全球整體 MaaS 市場產值將由 2017 年的 380 億美金以 10 倍的幅度，在 2025 年成長至 3580 億美金，爰此，不僅芬蘭 MaaS Global 公司刻正將 Whim 在 Helsinki 的經驗拓展到全球市場，包含目前在英國中部大城 Birmingham、荷蘭首都 Amsterdam 與比利時 Antwerp 地區都有芬蘭 MaaS Global 公司相關營運與試驗計畫，該公司目前更持續與奧地利、加拿大與新加坡等國洽談合作計畫，而德國的 Moovel 公司亦正在美國 Austin、Boston 與 Portland 等城市進行 MaaS 試驗計畫，顯見歐洲先進各國除了持續發展 MaaS 服務提供國內各城市使用外，更致力於扮演全球 MaaS 服務提供者的企圖心；從歐洲 MaaS 的發展趨勢中可發現，跨國與跨公司間的聯盟合作日益密切，跨國公司在世界各地佈局 MaaS 服務的同時，亦與當地的公私機構組成策略聯盟，協同跨國產官學研之經驗推動 MaaS 的發展方向值得我國借鏡。
3. 本次出國計畫特別著重於考察全球在 Mobility as a Service 之現況與發展方向，本所未來將持續運用精緻、友善與便利的先進科技來推動創新交通運輸服務模式，上開出國考察與研析結果可作為我國未來推動相關重要專案之參考。

# 附錄

## 丹麥哥本哈根第 25 屆 ITS 世界年會-年會手冊



25<sup>TH</sup> ITS WORLD CONGRESS  
**COPENHAGEN**  
17 – 21 SEPTEMBER 2018  
*Quality of life*

# Programme

25th ITS World Congress  
Copenhagen, Denmark  
17 – 21 September 2018  
[www.itsworldcongress.com](http://www.itsworldcongress.com)

Organised by:  

Co-organised by:  

Hosted by: 

Supported by:   

# Acknowledgements

## Diamond Partners



## Gold Partners

## Silver Partners



## Official Media Partners



## Media Partners



## Nordic Media Partners



## Media Supporters



## Event Partners



## ITS Nationals



## European Commission

The European Commission is very pleased to invite you to the 25th ITS World Congress, to be hosted in the European city of Copenhagen from 17th to 21st September 2018.

The main theme of the Congress, "ITS – Quality of Life", brings to the forefront an important mission of Intelligent Transport Systems: enhance people's daily life through smart mobility solutions, putting the user and their specific needs at the centre of the mobility system.

The Congress will be an ideal opportunity to extend and share your knowledge about the latest technologies and policy developments in different areas of the world and help forge new partnerships and opportunities to change mobility together. Topics like security, privacy and interoperability can greatly benefit from international cooperation. The Congress will therefore look into these and other areas where progress is critical to speed up the deployment of Intelligent Transport Systems.

The 25th ITS World Congress is going to take place while the European Commission will be promoting 'multimodality' with a range of initiatives throughout 2018, to make our mobility system more efficient and sustainable and serve better the needs of its users. We are particularly happy to host this Congress in this special year, in view of the important role of Intelligent Transport Systems in achieving these goals.

We very much hope you can participate and enrich the Congress with your experience, with your knowledge and perspective on how to improve the quality of life through Intelligent Transport Systems. Looking forward to seeing you in Copenhagen,

Yours sincerely,

**Violeta Bulc**

European Commissioner for Transport

**Mariya Gabriel**

European Commissioner for Digital Economy and Society

**Carlos Moedas**

European Commissioner for Research, Science and Innovation



## HRH the Crown Prince becomes Patron for the ITS World Congress 2018 in Copenhagen

HRH the Crown Prince to be Patron for the 25th ITS World Congress 2018 in Copenhagen. HRH the Crown Prince will attend the Official Opening Ceremony of the Congress on Monday 17 September at 16:00 in the Bella Center. *Photo: Franne Voigt (copyright).*



HRH the Crown Prince of Denmark

## City of Copenhagen



**Frank Jensen**  
Lord Mayor of  
Copenhagen

It is with great pleasure that I welcome you to Copenhagen and invite you to join us at the 25th ITS World Congress. It is with pride, too, as it will be the first time that Denmark, and the capital of Denmark, will be hosting the largest Congress in the world within the ITS industry.

When coming to Copenhagen, you will find yourself in the heart of history with beautiful historic buildings blended with the revolutionary ITS solutions of tomorrow. By using Intelligent Transport Solutions (ITS) we aim to create quality of life for the Copenhageners.

The city fuses quality of life at local level with a global outlook. It is internationally renowned for its innovative approach to climate and the environment. It has a reputation as the world's best city for cyclists. It is a living showcase for Danish architecture. But most of all, Copenhagen is a good place to be. None of this came about by chance. It is the result of years of planning and development based on the needs of Copenhageners.

As the capital of a small country with 5.6 million inhabitants, with almost 600,000 living in Copenhagen, you would think that we could rest on our laurels. Nevertheless, Copenhagen is among the top five fastest growing big-city destinations in Europe, and an extra 100,000 inhabitants by 2025 means more of us in the same space. We will have to work harder to keep the city together. Getting around will have to be easier. ITS is one of the means to creating a city that manages to face challenges and still be a liveable, edgy and responsible city.

The goal of the City of Copenhagen's 'Business and Growth Policy' is to become Northern Europe's leading business metropolis – where growth and quality of life go hand in hand. By 2020, the annual GDP growth will have increased to 5 %, with an estimated 20,000 new private jobs created, and productivity will have increased by 4 %. These ambitious goals will be achieved through strengthening and maintaining Copenhagen as an open city that attracts international companies, investments, highly skilled international professionals, tourists and big events.

In Copenhagen we see ITS as a driver for growth, commercial development and knowledge sharing on a global scale. We have invested nearly half a billion on intelligent traffic lights and street lighting within the last couple of years. The ITS World Congress 2018 is a lever to bring together international public and private partners in a close collaboration that will contribute to the advancement of worldwide future ITS solutions. On a regional level, the goal is that the Congress should strengthen the potential of cross-border partnerships in Greater Copenhagen, and reinforce the wide-ranging alliance within the Nordic Region.

I look forward to welcoming you in Copenhagen.



**Ninna Hedeager Olsen**  
Mayor of Technical  
and Environmental  
Affairs in  
Copenhagen

I am pleased to invite you to the 25th ITS World Congress 2018 in Copenhagen. The City of Copenhagen is proud to be hosting the Congress, which will be an essential meeting point for the ITS community. We have chosen the overall theme 'ITS – Quality of Life' for the Congress.

The city streets and squares of Copenhagen will be available for the display of innovative ITS demonstration projects. We hope to see many contributions that will give participants the opportunity to discover the latest technical innovations, exchange good practices with foreign colleagues, and grow their personal network within the industry.

Copenhagen wants to be the European leader within green technology and innovation. To that end, the City of Copenhagen is active in a number of innovation projects, including making public transport more attractive and less polluting as well as raising the average speed of cyclists by using ITS solutions to prolong green lights.

ITS can help us to improve traffic flow and road safety, and to promote cycling and public transport. That's why the development of ITS is so important to us, and I hope that the Congress will be a lever to carry on this agenda in the ITS community.

The green agenda goes hand in hand with the citizens' needs, and a green city is a precondition for a liveable and healthy city. We say that the city is for the people and by the people. To ensure that Copenhagen is one of the top global cities in 2025, we must all work together to create 'A Liveable City', 'A City with an Edge' and 'A Responsible City'.

We look forward to welcoming you to Copenhagen and will do our utmost to create a fantastic setting for the ITS World Congress.

I am convinced you will enjoy your rendez-vous with a beautiful, historic city where quality of life is in the core of everything we do.

## ERTICO – ITS Europe, ITS America and ITS Asia-Pacific

On behalf of ERTICO – ITS Europe and its 120 Partners, I would like to invite you to the 25th ITS World Congress hosted by the city of Copenhagen from 17 to 21 September 2018.

"ITS – Quality of life" is the theme of the next Congress where intelligent solutions meet citizens' needs. Copenhagen was recently named one of the world's most liveable cities largely because of its developments and commitments to improve sustainability. The city is working hard to become carbon-neutral by 2025, and in the next ITS World Congress we will learn about the technologies and policies they are using to help this beautiful city achieve this goal.

With a programme focusing on mobility services, ITS and the environment, connected and automated transport, satellite technology, big and open data, freight operations networks operations, the ITS World Congress 2018 will show how intelligent transport and ITS systems and services can drive the deployment of smart cities.

The conference programme will be complemented by a fantastic exhibition and demonstrations showcase. Hundreds of companies and visitors from over a hundred countries around the globe will participate in the exhibition at the Bella Center, covering a total surface of 20,000+sqm. It will feature more than 30 demonstrations of the latest state-of-the-art products and solutions for real-world mobility scenarios.

For five days, 10,000+ transport technology experts and businesses will gather in the stunning city of Copenhagen. I hope you can join us in September 2018.



**Jacob Bangsgaard**  
CEO ERTICO – ITS  
Europe

On behalf of the Intelligent Transportation Society of America, welcome to the 25th ITS World Congress in Copenhagen! I have been to previous World Congress events, but this is my first as president and CEO of ITS America, and I am looking forward to the sessions, demonstrations, and exhibitions.

It's fitting that the theme of 2018's World Congress is "ITS – Quality of Life." Copenhagen hopes to become the first carbon-neutral city by 2025, and intelligent transportation is critical to achieving that goal.

Building on the success of Montreal and Melbourne, this World Congress will focus on topics including ITS and the environment, the impact of connected and automated vehicles, applying satellite technology to mobility, and cross-border mobility solutions. Participants will have multiple opportunities to learn about these and other topics by participating in discussions and demonstrations, as well as spending time talking to exhibitors.

At ITS America, we advance the research and deployment of intelligent transportation technologies to save lives, improve mobility, promote sustainability, and increase efficiency and productivity. Our members, along with other industry stakeholders, are eager to engage with others around the world who share these same goals. The 2018 World Congress in Copenhagen is the venue in which we can make those connections with policymakers, entrepreneurs, researchers, academics, investors, and many others. I am confident it will be as exciting and valuable for you as I know it will be for me. Have a great week, and I look forward to seeing you in Copenhagen!



**Shailen Bhatt**  
President and CEO  
ITS America

On behalf of ITS Asia-Pacific, I would like to invite you all to the 25th ITS World Congress in Copenhagen. ITS World Congress started 24 years ago as a cross disciplinary platform for research and development of Intelligent Transport Systems. Experts in mechanical engineering, civil engineering, electronic engineering and information science got together and worked together to create integrated transportation domain. As more attentions are paid to real world deployment, government officials, industry leaders, transportation service operators and entrepreneurs more actively joined for effective public investment and business opportunities.

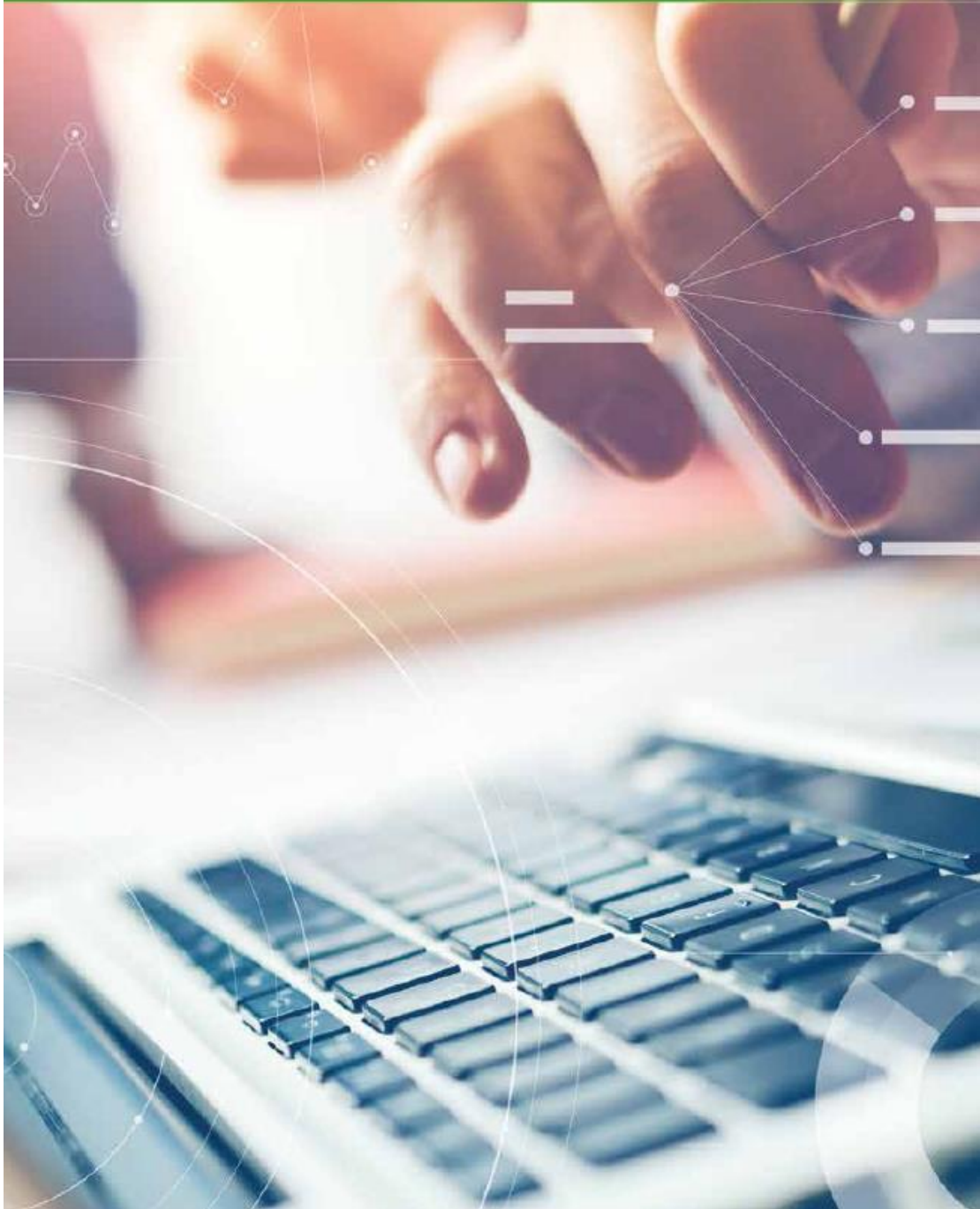
Now, we have connected and automated vehicle technologies at hand and innovative transport services are emerging brought by new breed of ambitious people. Huge expectations and concerns are mixed as 'singularity' seems to be quickly approaching. Based on the achievements and experiences on ITS we have built, we have to quantitatively evaluate both potential benefits and risks of the innovative technologies and social innovations. How ITS could contribute to the wellness of people's life and sustainable development of the society.

Under the theme of 'ITS – Quality of Life', ever expanding diversity of contributions are anticipated to be shared across the academic disciplines, the industrial sectors and jurisdictions. I'm looking forward to your contribution and seeing you in Copenhagen.



**Hajime Amano**  
Secretary General  
ITS Asia-Pacific

# Programme



## The Event

Hosted in a different location each year, the ITS World Congress is an international meeting point for the mobility sector, rotating between Europe, the Americas and Asia Pacific. This year, ERTICO – ITS Europe and the City of Copenhagen will host the 25th ITS World Congress. The Congress will attract more than 10,000 participants from over 100 countries, featuring more than 150 sessions, 400 exhibitors, several demonstrations and technical tours, as well as a series of associated events, social occasions and networking opportunities. This year's theme "ITS – Quality of Life", focuses on putting citizens first when it comes to mobility design - the ITS Congress will be the place to be to discuss and exchange best practices on how to achieve true quality of life in our cities.

The Congress' three pillars- the Programme, the Exhibition and the Demonstrations, will have a common thread covering all modes of transport; from improving the efficiency of land and maritime freight transport, to

the key elements for building smart cities. Experts from the mobility sector (and beyond!) will discuss concerns related to cybersecurity, resilience planning and winning solutions for our transport infrastructure. There will also be focus on multimodality and the journey to achieving true seamless and effortless mobility. Last but not least, Cooperative, Connected and Automated Mobility will be highlighted with special focus on the legal and safety aspects.

Demonstrations and Technical visits are also a fundamental part of the Congress, and are one of the most interesting parts of the event. Participants can test new products and services, and experience vehicle technology first hand. They can also join Copenhagen's most innovative transport organisations on guided tours to experience the complex details of structures and systems backing Europe's most liveable city.

## Organisers and Host

### ERTICO – ITS EUROPE

ERTICO – ITS Europe is a public-private partnership of 120 companies and organisations representing service providers, suppliers, traffic and transport industry, research, public authorities, user organisations, mobile network operators, and vehicle manufacturers. ERTICO embodies thought leadership and fosters stakeholder engagement; Together with our partners, we develop, promote and deploy Intelligent Transport Systems and Services (ITS) through a variety of activities including European co-funded projects, innovation platforms, international cooperation, advocacy and events. ERTICO is the organiser of the annual ITS regional and global Congress in Europe. Our work focuses on Connected & Automated Driving, Urban & Clean Mobility, and Infrastructure & Logistics.



### European Commission

The European Commission represents the general interest of the EU and is the driving force in proposing legislation (to Parliament and the Council), administering and implementing EU policies, enforcing EU law (jointly with the Court of Justice) and negotiating in the international arena. The European Commission has its headquarters in Brussels, Belgium, and some services also in Luxembourg. The Commission has Representations in all EU Member States and 139 Delegations across the globe.



### City of Copenhagen

Copenhagen is among the top 5 fastest growing big city destinations in Europe, and is a growth engine for Denmark. The City of Copenhagen is engaged in regional and international relations. To expand the visibility of the solutions that are employed, tested and demonstrated in Copenhagen we work to promote the city as an international showcase for smart green solutions. We do this by establishing showcase platforms, membership of international city networks and other means that showcase the solutions to a wider global audience. On the regional level, Copenhagen cooperates closely with the neighbouring regions in order to create an attractive business region.





# Programme at a glance

			Bella Center		Hall B				
			Auditorium Bordeaux	Auditorium Vienna	Tokyo	Montreal	London	Madrid	Turin
<b>Monday 17 September</b>									
11.00 – 12.30					SIS01 Comparing permits authorising trials of automated vehicles. Which works best?	TS01 Legal and governance issues	SIS02 Communication technologies for connected vehicles and automated driving		TS02 City air quality
Lunch (12.30 – 13.30)									
13.30 – 15.00					SIS09 Legal framework for AV accident	TS05 The future evolution of ITS	SIS10 Assessing next generation technologies for emerging future transportation environments	SIS03 Bringing new products and services to market	TS06 Electromobility
16.00 – 17.30	Copenhagen Hall		Opening Ceremony						
<b>Tuesday 18 September</b>									
09.00 – 10.30					SIS16 Automated buses: the future of (last-mile) public transport?	TS10 Better parking terminal operations	SIS17 Evolution from current automotive connectivity and ITS deployments to 5G and 5G C-V2X	TS11 Communication Technologies 1	SIS18 ITS For Life
Coffee Break									
11.00 – 12.30	PL1		Achieving higher quality of life in our cities						
Lunch (12.30 – 13.30)									
13.30 – 15.00	ES01 Healthy and livable cities	ES02 Putting citizens first in mobility design			SIS23 Deployment of Autonomous Shuttles on Public Roads – Experiences from Different Countries	TS15 Safety	SIS04 Smart Villages: ITS in Rural Areas	TS16 Standards and architecture	SIS25 Promote the Electromobility integration in urban environment
Coffee Break									
15.30 – 17.00	ES03 Essentials for developing a smart city	ES04 Managing the obbs and flows of travel			TS20 Public transit systems	TS21 User acceptance	SIS28 Cooperative ITS Standards Gaps	TS22 Communication technologies 2	SIS29 Copenhagen CO2-Neutral By 2025
Coffee Break									
17.15 – 18.45					SIS34 Autonomous Vehicles in Public Transport	SIS35 Strategy of Practical Implement of V1 Cooperative Systems for Traffic Accident Avoidance	SIS36 ICT serving automated road transport	SIS37 From Problem to Prototype: A Coordinated, Use-Case Based Approach	SIS38 Challenge of a common methodology to assess ITS impact on reducing emissions
<b>Wednesday 19 September</b>									
09.00 – 10.30					SIS42 Automated shuttles – lessons from trials and the path to deployment	TS27 Vulnerable Road Users	SIS43 Technical Challenges to Integrating Low Speed Automated Vehicles into the Transportation Network	TS28 Roadmaps to deployment	SIS44 Smart metrics for smart cities – traffic signals' contribution to livability
10.45 – 11.30									
Coffee Break									
11.00 – 12.30	PL2		Ensuring integrated mobility services						
Lunch (12.30 – 13.30)									
13.30 – 15.00	ES05 MaaS: Seamless and effortless mobility	ES06 Institutional and legal challenges of CCAM			SIS48 Effective Measures of Success: The United States Connected Vehicle Pilots	TS32 V2X Solutions & Concepts	SIS49 Fast deployment of V2X using cellular networks and neutral servers	TS33 Sensing, detection, classification	TS34 Testing new approaches 1
Coffee Break									
15.30 – 17.00	ES07 The role of Open Data in the digital infrastructure – AM	ES08 Efficiency in freight transport – EU			SIS53 Impact Assessment of Automated Vehicles on Traffic flow and Environment	TS38 Traffic management and connected infrastructure 1	SIS54 Establishing a Large-Scale Security Credential Management System for V2X Communication	SIS55 Fusion of road infrastructure and vehicle sensor data for automated driving	TS39 Signal optimising and traffic management

Hall B								Exhibition – Hall C	
Berlin	Paris	Orlando	Sydney	Melbourne	Nagoya	Europe	Stockholm Nordic stream	ITS Forum	Theatre
	TS03 Traffic data 1	SIS05 Maximise the potential and the market uptake of the EGNSS in mobility	SIS06 IBEC-ITS resources to aid practitioners and decision-makers	TS04 Open data and information	SIS07 Rural MaaS – from definition to action	SIS08 ITS for Persons with Reduced Mobility (PRM)			
SIS12 Defining Smart Cities: What is Best for its Citizens?	TS07 Traffic data 2	TS08 Satellite services and mapping	SIS13 Public and private partnerships towards Quality of Mobility and Quality of Life	TS09 Network management tools	SIS14 User-centric approaches enabling automated vehicles in mixed traffic	SIS15 IoT advancing Automated Mobility and Smart Cities for improved Quality of Life	NS0 Cross border mobility solutions: towards a seamless future by the ITS Nationals		
SIS19 The Next Traffic Management with Open Big Data to Automated Driving Era	TS12 Realising MaaS	TS13 Traffic flow and data	SIS20 Improved Situational Awareness to Drive Improved Operations	TS14 Public Private Cooperation	SIS21 How to build a roaming ecosystem for MaaS?	SIS22 Carolee paying for mobility in 2018	NS1 The technical platform for seamless traveling	C40 Opening Masterclass: Healthy & Livable Cities – experience from leading cities	
SIS26 Intelligent Operations Models for Mobility-as-a-Service	TS17 Data and public transport	TS18 Road safety measures and applications	SIS27 The value chains of (interactive) traffic management	TS19 Use of tolling in network operations	SP01 Environmental studies	SIS23 Accessing Travel and Traffic Data in the EU	NS2 Global standardized real-time maritime information sharing – why now?	Workshop: Connected, cooperative and sustainable – how cities can accelerate cycling through intelligent mobility solutions	CP1 Urban living services 1
SIS30 Predictive Analytics for Intelligent Mobility	TS23 Seamless travel	SIS31 5G with Satellite – Delivering Resilience and Reach	SIS32 Advanced technologies for operation and maintenance of ITS Facilities	SIS33 Using Big Data to Reduce Congestion & Prioritise Government Spending	SP02 Users' needs and social factors 1	Workshop: Transforming Freight Movement through ITS	NS3 How can Self-Driving Feeder Services improve Public Transport?	Start-up prize	Sund & Baat commercial presentation
SIS39 Mobility as a Service – new business and service approaches	TS24 Living Labs and Human factors	TS25 Positioning and fleet management	SIS40 Cooperative ITS services: moving from cross-border interoperability to market roll-out	TS26 Traffic demand strategies	SP03 Users' needs and social factors 2		NS4 Automation and safety – sea, road and railway	SIS41 5 smart city European initiatives you want to meet: opportunities for cities-industry	Space-driven innovation for smarter, greener and safer roads
SIS45 Challenges on testing and validation of automated driving	TS29 ITS for ageing population	TS30 Charging and fleet management	SIS46 Using analytics to drive better decisions and improve transportation service delivery	TS31 Improving intersection management	SP04 Safety 1	WS EU and Global opportunities for financing ITS	NS5 CaaS – Corridor as a Service	SIS47 Future of Mobility: The questions we are afraid to ask!	TELEGRA commercial presentation
									SAENA commercial presentation
SIS50 Sharing data for traffic information between road authorities and service providers	TS35 MaaS planning & policy	SIS51 Autonomous Freight Vehicles: Benefits, Risks and Governance	TS36 Network security	TS37 Cross-border solutions	SP05 Safety 2	SIS52 Implementing MaaS pilots in Europe: state of the art and expected impacts	NS6 Travellers Needs in Focus: Traffic Information in a United Voice	Workshop: how cities use cycling and ITS to develop a sustainable and smart transport system	CP2 Data services
SIS56 Preparing next generation mobility	TS40 Behavioural factors 1	SIS57 Modelling the impact of Smart Mobility with traffic and transport simulation models	TS41 Motorway operations	TS42 Network management policies	SP06 Security, testing and resilience	SIS58 Secure and precise positioning: a key to success for autonomous driving	NS7 ITS deployment corridors		

Session types: PL: Plenary Session ES: Executive Session SIS: Special Interest Session TS: Technical Session SP: Scientific Session CP: Commercial Paper Session NS: Nordic Stream

# Programme at a glance

			Hall B				
Bella Center			Tokyo	Montreal	London	Madrid	Turin
Auditorium Bordeaux							
Auditorium Vienna							
<b>Thursday 20 September</b>							
09.00 – 10.30	<b>ES09</b> Delivering effective CCAM	Workshop: ITS Security and Safety Issues for Automated Vehicles & MaaS 8.30 – 11.00	<b>SIS09</b> Road authorities and operators and connected, cooperative transport	<b>TS43</b> Traffic management and connected infrastructure 2	<b>SIS00</b> Cybersecurity for Public-Facing ITS Systems	<b>TS44</b> Testing and Simulations	<b>SIS07</b> Enabling electrification services interoperability and enhanced performance of electric vehicles
Coffee Break							
11.00 – 12.30	<b>ES10</b> The real impacts of CCAM	Part 1: TM 2.0 and Public Authorities as Service Providers in Traffic Management	<b>SIS05</b> Data in autonomous driving: different strategies to data compatibility	<b>TS48</b> Mixed traffic and transitions	<b>SIS06</b> Open Auto Drive Forum: A New Cooperation Approach for Automated Driving Ecosystem	<b>TS60</b> Security	<b>TS45</b> Vehicle detection and network efficiency
Lunch (12.30 – 13.30)							
13.30 – 15.00	<b>ES11</b> Enhancing the cybersecurity & resilience of transport infrastructure	Part 2: TM 2.0 and hybrid infrastructure as enablers for MaaS in the context of automated transport		<b>TS65</b> Impact evaluation	<b>SIS72</b> Taking automated driving to the next level: solving challenging environmental conditions	<b>TS66</b> Traffic Control and Data	<b>SIS73</b> Connected Vehicle Certification – Today, Tomorrow and Beyond
Coffee Break							
15.30 – 17.00	<b>ES12</b> Upping the game in safety		<b>SIS76</b> Investigating the emerging employment opportunities created by future transport technology	<b>TS62</b> Modelling and simulation	<b>SIS77</b> Automated vehicle data sharing enabled by Feature Extraction and Anonymisation	<b>TS63</b> Alertness in automated vehicles	<b>SIS78</b> Deploying Connected ITS in small cities
Coffee Break							
17.15 – 18.45			<b>SIS84</b> Highway chauffeur and high density truck platooning in real environment	<b>TS66</b> Traffic management and connected infrastructure 3	<b>SIS85</b> Integrating Technology, Data, People and Training for Successful Traffic Incident Management	<b>TS67</b> Data and ITS	<b>TS68</b> CAV Testbeds 1
<b>Friday 21 September</b>							
09.00 – 10.30			<b>SIS90</b> Deploying C-ITS services and Learning from evaluations	<b>TS72</b> Traffic management and connected infrastructure 4	<b>TS73</b> Testing new approaches 2	<b>TS74</b> Automated decision making	<b>TS75</b> CAV Testbeds 2
Coffee Break							
11.00 – 13.00	<b>Auditorium Hamburg</b> PL3 What's next for automated mobility? + Conclusions + Closing Ceremony						
Lunch (13.00 – 14.00)							

Topics:	Mobility services	Environment	Automation	Freight	Satellite	Transport networks	Cross-border
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# 25th ITS World Congress

Copenhagen, Denmark, 17 – 21 September 2018

Hall B								Exhibition – Hall C	
Berlin	Paris	Orlando	Sydney	Melbourne	Nagoya	Europe	Stockholm Nordic stream	ITS Forum	Theatre
SIS61 Making Work Zones Smarter	TS46 Behavioral factors 2	TS47 Using technology to deliver goods	SIS62 Traffic IoT sensing by various manners	TS48 Travel time estimation	SP07 Data and information	SIS62 The Digital Transport and Logistics Forum (DTLF): headway towards digitised and connected supply chains	NS6 Arctic Snowhow and the Automation of Transport System		
TS61 Mobility on demand	TS62 Enhancing safety 1	TS63 Improving freight flows – logistics and innovation	SIS68 ITS and Cognitive Technologies: Exploiting Artificial Intelligence and Machine Learning	TS64 Traffic flow control	SP06 Network management	SIS66 Systemic impacts from infrastructure-based management of connected and automated driving	NS6 5G/IGS opportunities and telecom connections with C-ITS	SIS70 Ports of the future towards automation	ITS WC Singapore 2019 promotion
TS67 ITS and mobility	TS68 Enhancing safety 2	TS69 Improving freight flows – logistics and smart data	TS60 Road management operations 1	TS61 Traffic Safety	SP06 Simulation and modeling	SIS74 European Cooperative, Connected and Automated Mobility (CCAM)	NS10 Open Ecosystem for Mobility as a Service	SIS75 Dragon's Den for the future of public transport	CP3 Network management services
SIS79 ITS for Shipping, Ports and logistics and ensuring a network data exchange : Part I	TS64 Enhancing safety 3	SIS60 Across the Pavement – smart freight delivery for the last metres	SIS61 Impacts of AVs on Pavement	TS65 Road management operations 2	SP10 Commercial vehicles and freight solutions	SIS62 Large scale deployment of C-ITS: Challenges and ways forward	NS11 Better mobility with Public Transport	SIS63 ITS decision-making in the round	
SIS66 ITS for Shipping, Ports and logistics and ensuring a network data exchange : Part II	TS69 City scale & ITS planning	SIS67 User friendly road infrastructure matched to multiple road users utilizing drive recorder	TS70 Data driven traffic management 1	TS71 Modelling and effective traffic management 1	SP11 Deep learning	SIS66 C-ITS Deployment becoming reality in Europe by 2019	NS12 Nordic test areas and demonstration sites	SIS69 Discussing the impact of automated driving: a serious game	
TS76 Smart Parking	Smarter Mobility for Connected Two-Wheelers Safety		TS77 Data driven traffic management 2	TS78 Modelling and effective traffic management 2	TS79 ITS for cycling		NS13 MaaS in real life – The delegate app?	Research That Defines The Future of Mobility	CP4 Urban living services 2

Session types: PL: Plenary Session ES: Executive Session SIS: Special Interest Session TS: Technical Session SP: Scientific Session CP: Commercial Paper Session NS: Nordic Stream



25<sup>TH</sup> ITS WORLD CONGRESS  
**COPENHAGEN**

# Congress Format

## PLENARY SESSIONS

All attendees are welcome to join the Opening and Closing Ceremonies and Plenary Sessions dedicated key ITS issues addressed by major personalities from the ITS world and beyond.

## EXECUTIVE SESSIONS

In these sessions high level industry executives, public officials and academics will draw from their experiences to discuss key topical policies, opportunities and challenges.

## SPECIAL INTEREST SESSIONS

Organised at the request of groups of experts developing and deploying ITS, these sessions provide the opportunity to focus on specific topics of interest.

## TECHNICAL/SCIENTIFIC SESSIONS

These sessions are composed of presentations by international experts and will include topics encompassing all technical, scientific, economic, organisational and societal aspects of ITS.

## COMMERCIAL PAPER SESSIONS

Commercial Papers describe an activity aimed at generating or improving a specific product, device or idea for the market. Papers will be presented in groups with a moderator in the Exhibition area.

## “OUT OF THE BOX” SESSIONS

These sessions taking place in the ITS Forum in the Exhibition, will feature different type of formats designed to encourage more interaction between the speaker and the audience.

## Topics



**Mobility services from transport to mobility**



**ITS and the environment**



**Connected and automated transport**



**Next generation goods delivery**



**Satellite technology applied to mobility**

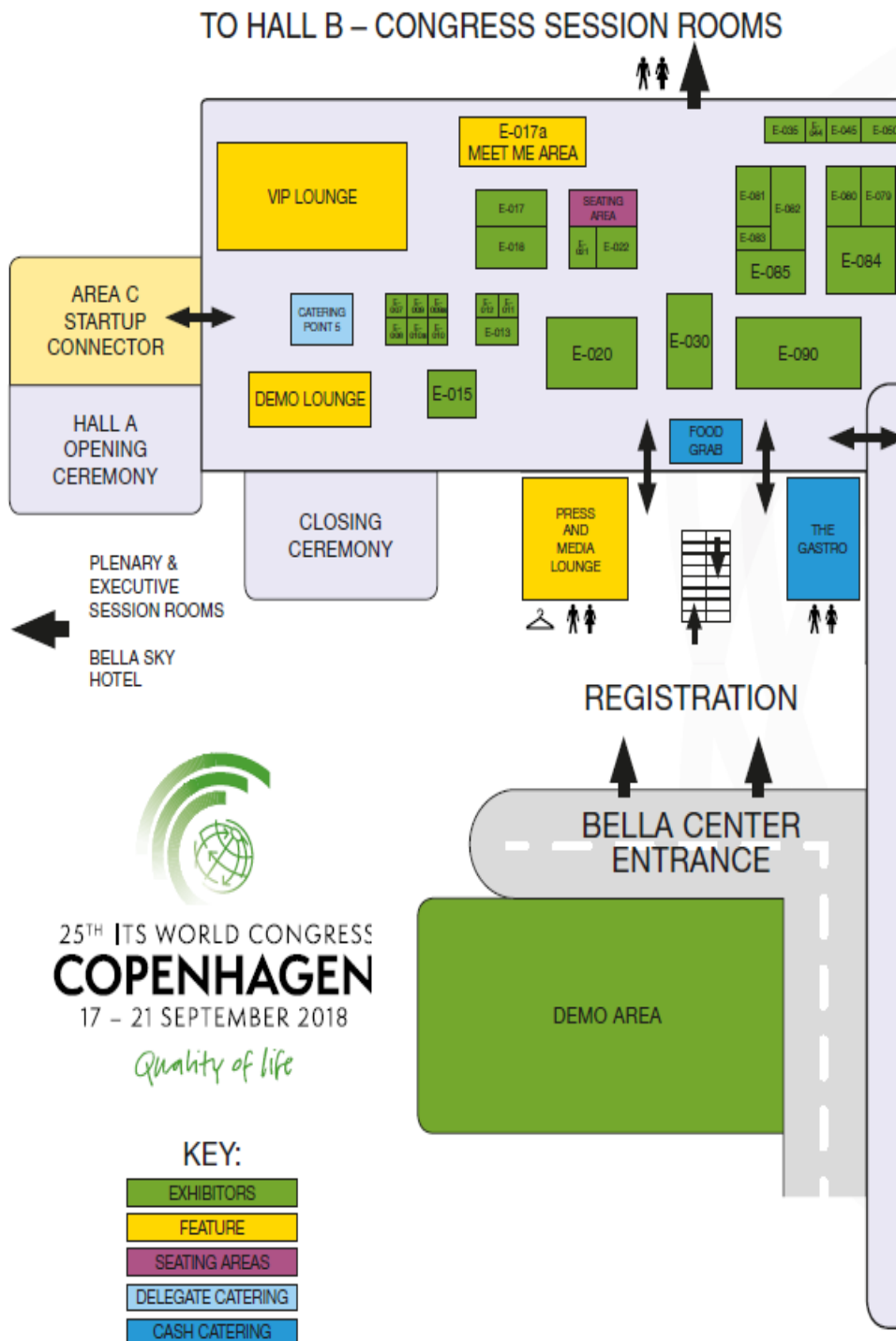


**Transport networks evolution**



**Cross-border mobility solutions**

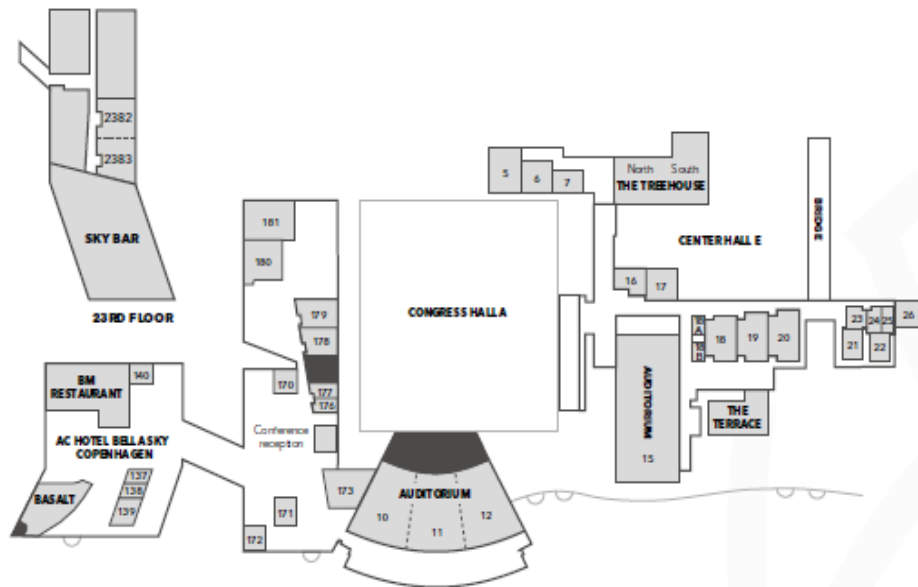
# Floorplan





# Venue Map

## First Floor



## Ground Floor





# General Information



## Internet access

Wireless internet connection is available in all the areas of the Bella Center.

## Language

English is the official language of the Congress. All spoken presentations, printed material and online information will be available in English only.

# Travelling to Copenhagen

## Travel by air

The airport is located roughly 10 minutes by car from the "Bella Center". Taxis are available at the Airport until the last flight. Should you prefer another means of transportation, you can take the metro or use the shuttle service. For more information on the public transportation and to plan your journey, please visit <https://dinoffentligetransport.dk/service/for-tourists/>

## Airport Shuttle Service

The shuttle service operates every 30 min from 6am to 11pm and runs between Copenhagen Airport and the AC Hotel Bella Sky Copenhagen (which is directly connected to Bella Center Copenhagen) and Crowne Plaza Copenhagen Towers. The shuttle bus is filled on a first come, first served principle. Price is DKK 15 / € 2 each way. From the airport to the hotel, the shuttle bus departs from the shuttle parking at terminal 2. You will find the timetable by the information counter. When departing the hotel, please order the shuttle bus at the hotel reception.

## Metro

The Metro line M1 runs between Vanløse and Vestamager (West Amager). The "Bella Center" Metro Station is located next to Bella Center Copenhagen's East Entrance. More information can be found at [www.m.dk/](http://www.m.dk/)

## Insurance and security

Kindly note that all attendees are requested to wear their badge for admission at all times. Please do not leave your personal items or coats unattended. There will be a cloakroom at your disposal. In addition, regular badge control will take place throughout the Congress.

## Buses

A number of bus lines (A4, 34, 250S) stop outside the Bella Center. Bus timetables and how to plan your trip with public transport can be found on the website <https://dinoffentligetransport.dk/service/for-tourists/>

## Trains

To get to and from Copenhagen Central Station, you can also take the bus line 30, which takes around 20–25 minutes. All regional trains also stop at Ørestad Station, where you can transfer to the Metro. Note that Intercity Trains DO NOT currently stop at Ørestad Station.

## By car

There is a motorway right to the front door from Denmark and Sweden. Follow the "Airport Motorway", E20. The exit to Center Boulevard is number 19 and is called "Ørestad" with "Bella Center" listed below. Parking is DKK 25/hour. DKK 100 for 24 hours

## Taxis

Taxis can pick up passengers at terminal 1 and 3. A taxi from Bella Center Copenhagen to the city centre costs about DKK 200. A taxi from Bella Center Copenhagen to Copenhagen Airport costs about DKK 150–200. Taxa: +45 35 35 35 35 <http://www.taxa.dk/en/airport-transfer/>

## Getting around Copenhagen – a green city is a precondition for a liveable and healthy city

.....  
For a city of its size  
Copenhagen has a  
surprisingly high number of  
Michelin Stars – 15 altogether!  
.....

It is often rated as one of the  
best places to live in the world

Tivoli Gardens is  
the world's second  
oldest amusement park  
(the oldest is Bakken, just  
north of Copenhagen)  
and is Denmark's most  
popular attraction

You can get to the city centre in  
about 13 minutes by metro or train

About 62% of  
Copenhageners cycle  
to and from work,  
so the cityscape is  
dominated by bike  
lanes, bike parking and  
special traffic lights

The driverless metro, buses  
and trains can bring you  
everywhere you want in the  
city. Elevators available at  
all metro and train stations

The  
original  
Carlsberg  
brewery was  
founded in 1847  
and is located in  
Copenhagen and is now  
one of the most popular  
places to visit in the capital

The Danish flag is the  
oldest flag in the world  
and, according to legend,  
was adopted in 1219

You can rent a City Bike all  
over Copenhagen. The city  
bikes are intelligent electric  
bikes available 24/7, 365  
days a year. Each bike has  
a touch screen tablet for  
navigation and guidance to  
points in Copenhagen. You  
can also rent bikes in shops  
all over Copenhagen

Almost every  
Copenhagener  
speaks English  
so you won't  
feel "lost in  
translation"

Shop high-end  
brands tax-free  
in Strøget street.  
Copenhagen's most  
famous shopping  
street is about one  
kilometre long and  
is perfect for high  
tax free purchases

**Copenhagen's harbour is  
clean enough for swimming**

Built in 1642,  
Copenhagen's iconic  
Rundetårn (Round Tower)  
is the oldest working  
observatory in Europe



## Europe

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