

F R O S T & S U L L I V A N

2024 CUSTOMER VALUE LEADER

*IN THE GLOBAL
AUTOMOTIVE MAP
INDUSTRY*



F R O S T & S U L L I V A N

BEST
2024 PRACTICES
AWARD

Best Practices Criteria for World-Class Performance

Frost & Sullivan applies a rigorous analytical process to evaluate multiple nominees for each award category before determining the final award recipient. The process involves a detailed evaluation of best practices criteria across two dimensions for each nominated company. TomTom excels in many of the criteria in the automotive map space.

AWARD CRITERIA	
Business Impact	Customer Impact
Financial Performance	Price/Performance Value
Customer Acquisition	Customer Purchase Experience
Operational Efficiency	Customer Ownership Experience
Growth Potential	Customer Service Experience
Human Capital	Brand Equity

Addressing the Complexities of Advanced Automotive Mapping

While the global automotive market continues to evolve rapidly, advanced driving technologies are pushing the boundaries of what automobiles can achieve. Specifically, high-definition (HD) maps emerge as a critical component in this transformation. As the demand for more sophisticated vehicles grows, so does the need for detailed HD maps to navigate complex environments. Automakers and consumers call for mapping solutions that cover broader areas and offer enhanced details and accuracy.

The push toward a new era of automotive excellence comes with challenges. Traditional map update cycles and single-source data collection methods no longer meet the demand. Urban and suburban driving environments with pedestrian crossings, traffic signals, and intricate road geometries require high fidelity. In addition, the industry’s pivot towards live, continually updated maps creates a necessity for timeliness and quality.

TomTom is at the forefront of addressing these issues with its unique map production approach. The company is enhancing its HD maps’ precision, coverage, and freshness with a multi-source strategy, combining data from survey vehicles, crowd-sourced insights, and contributions from various partners. Its methodology provides an essential foundation as automakers navigate the hurdles of integrating advanced in-vehicle navigation services. For instance, TomTom offers robust support for developing next-generation in-vehicle infotainment and connected suite solutions. Through its commitment to collaboration, the company drives the automotive industry toward a future where vehicles are safer, more

connected, and increasingly autonomous.

TomTom: Mapping the World in Real Time

Founded in 1991 and headquartered in the Netherlands, TomTom is a trailblazer in developing location technology and digital mapping solutions. Over the past three decades, the company has refined personal navigation and unlocked the potential for mapmaking with its real-time, community-driven mapping technologies. Today, TomTom sets new global standards and offers a robust foundation for innovators, automakers, developers, and businesses of all sizes. To inspire innovation, the company leverages cutting-edge artificial intelligence and partnerships with leading technology companies to build fresh, accurate, and interoperable maps. TomTom's passionate team of 3,700 individuals delivers mapping solutions that enable seamless navigation for millions globally.¹

The HD Map Redefining Roadway Navigation

TomTom's HD Map is a comprehensive road model that encapsulates the essence of innovation in pursuing autonomous driving. Its real-time infrastructure provides a border-to-border, highly accurate, and realistic representation of the roadway, including essential details for advanced driving applications. The HD Map revolutionizes automated driving systems with its three-dimensional geometry. It provides an exact model of the surrounding environment, allowing vehicles to navigate with unprecedented precision of one meter or better. Additionally, it enriches driving with lane-specific information for nuanced navigation and maneuvering, from recognizing lane dividers to adhering to speed limits.

"TomTom delivers its technology across various markets, including enterprise, government, automotive, and consumer sectors. The company offers superior location-based services that span over 235 countries and territories. This expansive coverage relies on community-driven insights, local expert knowledge, and traditional data sources such as survey vehicles, front camera observations from consumer vehicles, and aerial imagery. The result is a vibrant, dynamic representation of the world that caters to the needs of over five billion people globally."

- Manuel Albornoz
Best Practices Research Analyst

The advanced mapping solution supports a variety of crucial functionalities for modern vehicles, such as hands-free driving, advanced lane guidance, and eco-routing, thereby elevating the overall driving experience. The HD Map offers end-users the benefits of highly precise vehicle positioning with minimal data usage. It also incorporates robust feedback mechanisms for ongoing refinement, ensuring a continuous enhancement of its capabilities.

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camera observations from consumer vehicles, and aerial imagery. The result is a vibrant, dynamic representation of the world that caters to the needs of over five billion people globally. TomTom's applications range from business intelligence to fleet management, insurance risk assessment, and retail

¹ "Who we are" (TomTom website: <https://www.tomtom.com/company/>)

² Frost & Sullivan Interview with TomTom (Frost & Sullivan, March 2024)

site selection.

One key aspect of the company's service is providing the most accurate real-time traffic information. TomTom offers a nuanced, constantly updated view of traffic conditions by leveraging data from over five trillion consumer-driven points, road sensors, and incident reports.³ It enables real-time navigation adjustments and provides a foundational dataset for predicting traffic flow, identifying bottlenecks, and planning future road network improvements. The company facilitates effortless shifts from manual to autonomous navigation by combining these real-time updates with the seamless blend of standard definition and HD maps. TomTom enhances its competitive edge by synthesizing multiple data streams in its production pipeline. This strategy ensures precision and freshness beyond what single-source automation might achieve.

TomTom Orbis Maps merges open and proprietary data sources, empowering its users to build on a robust, future-proof foundation, offering an interoperable solution. With its combination of high-quality, fresh, and accurate data, Orbis Maps ensures reliability and richness in map content, allowing for the development of custom, private solutions that are both flexible and ownable. This mapmaking platform supports various applications, from fleet and logistics to automated driving. Users can enhance base maps with routing datasets and real-time traffic information for a precise estimated time of arrival, simplify on-demand services with detailed street maps and points of interest, identify optimal routes and charging points for electric vehicles, and improve driver safety with predictive mapping for automated vehicles. Above and beyond, TomTom Orbis Maps facilitates seamless integration and data delivery through robust Maps application programming interfaces or directly via the Automotive cloud platform, which is available in multiple formats.

As the latest innovation built on the common mapping standard developed with Overture partners, TomTom Orbis Maps also integrates resources from the Overture Maps Foundation™, OpenStreetMap, partner data, and sensor-derived observations.⁴ Looking ahead, it will also accommodate customer data, enhancing interoperability and fostering rapid advancements in geolocation technology. Orbis stands out as TomTom's platform for map customization at the layer level, distinguishing it in the market and highlighting its superior value proposition over competitors, especially in areas like automated driving.

Ultimately, the company's complete map stack enables flexibility and customization that is pivotal for original equipment manufacturers (OEMs) and developers looking to tailor mapping solutions to their specific needs. MultiNet is TomTom's robust road network database tailored for high-demand applications. ConnectPlus extends the company's mapping prowess into emerging markets, enhancing basic navigation and achieving flawless synergy with MultiNet. Conversely, Connect provides essential routing and geocoding capabilities, reaching territories where MultiNet and ConnectPlus do not tread. Collectively, these offerings create a stratified digital mapping ecosystem, delivering exhaustive worldwide coverage.

³ "Maps & enhanced Content" (Provided by TomTom)

⁴ "TomTom Orbis Maps" (TomTom website: <https://www.tomtom.com/tomtom-orbis-maps/>)

The Comprehensive Impact of TomTom's Innovations

"With over 30 car brands and 14 million vehicles implementing TomTom's advanced driver assistance systems (ADAS) map content, the company's prominent standing in the automotive world is evident. Its innovation in speed assist, speed control, lane control, and comprehensive HD maps brings state-of-the-art driver warnings, assisted driving, and automated driving capabilities to the forefront of vehicle technology."

- Kamalesh Moharagam
Research Manager

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Automotive giants like Stellantis, Daimler, BMW Motorrad, Renault, Volkswagen, Toyota, Mazda, and the electric mobility-centric MIH Consortium rely on

TomTom's expertise alongside technology leaders like Microsoft and Huawei.⁶ The company boasts enterprise partnerships across multiple sectors, including optimizing the service industry through collaboration with IFS, enhancing delivery timeliness with Sygic, streamlining fleet operations alongside Omnitracs, and accelerating automated driving technology with HELLA Aglaia.⁷ TomTom also leads innovation in waste management through its partnership with Prometheus, enhances traffic flow analytics alongside PTV Group, and advances intelligent speed assistance technology with Rolling Wireless.⁸

"We're thrilled that all Hyundai and Kia drivers in Europe will benefit from the comfort and safety of TomTom's best-in-class geolocation technology. TomTom is a partner we trust to deliver highly accurate map data that enhances our Highway Driving Assist technology and real-time traffic information that helps us optimize navigation guidance and ETAs."

- Haeyoung Kwon
Vice President and Head of
Infotainment Development Group,
HMG

Customer Success Scenarios:

Hyundai Motor Group⁹: To meet the need for enhanced safety and compliance with new ISA regulations, Hyundai Motor Group has partnered with TomTom. This collaboration will bring TomTom's high-quality traffic and map services, as well as its Advanced Driver Assist Systems (ADAS) data, to all Hyundai, Kia, and Genesis models in Europe, also ensuring compliance with the Intelligent Speed Assistance (ISA) regulations that have been mandatory since July 2022. By integrating TomTom's technology, HMG's drivers will experience improved in-dash navigation and an all-round safer, more comfortable drive.

⁵ Frost & Sullivan Interview with TomTom (Frost & Sullivan, March 2024)

⁶ "Customers" (TomTom website: <https://www.tomtom.com/customers/>)

⁷ Ibid.

⁸ Ibid.

⁹ "Hyundai Motor Group & TomTom" (TomTom website: <https://www.tomtom.com/customers/hyundai-motor-group/>)

BMW Motorrad¹⁰: BMW Motorrad needed a navigation solution tailored to the needs of motorcycle enthusiasts, which led to an alliance with TomTom. This partnership resulted in an integrated application solution that infused TomTom Rider technology into BMW's motorcycles. TomTom's state-of-the-art navigation is now accessible through the BMW Connected application and handlebar display. TomTom Rider device musters up-to-the-minute traffic and weather updates, exclusive rider-tested routes for various adventures, and the convenience of offline and online map access, ensuring riders are well-guided on the open road.

"We selected TomTom as our map and traffic data provider because the company was open to exploring new business models, allowing us to cooperate with them and to grow. We also find TomTom technology first-rate in scope, depth, and accuracy."

- Martin Hornacek
Head of Maps, Sygic¹

Sygic¹¹: With 200 million drivers and over 2,000 fleets relying on its services, Sygic needed advanced routing capabilities. By integrating TomTom's comprehensive location and traffic data, Sygic's Professional Navigation solution offers sophisticated, dynamic routing tailored for commercial fleets, accounting for many critical factors, such as vehicle specifications and road restrictions. This synergy empowers drivers with real-time and historical traffic insights from over half a billion connected devices, refining route planning and ensuring accurate estimated time of arrival predictions.

Mapping the Way to Satisfaction: A Customer-centric Approach

TomTom's commitment to delivering customer value permeates every aspect of its operations. The company's unique mapping features help OEMs deliver a distinct driving experience, boosting user satisfaction and loyalty. Furthermore, TomTom engineered its mapping solutions to be scalable across different levels of automation and vehicle classes, understanding the diverse requirements of its customer base. The company employs a multifaceted strategy incorporating direct feedback mechanisms, third-party data integration, and governmental collaboration to refine the precision and utility of its offering.

Survey vehicles lay the data groundwork for TomTom's mapmaking process. The company then enhances this data using third-party datasets and partners with governments to integrate it into the HD map validation workflow. Finally, TomTom implements a "localization quality framework" to assess HD maps by determining how effectively a vehicle can self-localize using the map under real-world conditions.

Recognizing the indispensable role of human oversight, the company keeps humans in the loop, allowing for timely intervention to resolve issues, produce training data, and validate the map data.

Driving Success: TomTom's Vision for the Future

In 2023, TomTom showcased remarkable financial success, underpinned by significant growth in revenue, an impressive automotive backlog, and a strong influx of free cash flow. The company reported a 9% increase in group revenue, reaching €585 million, with location technology revenue rising by 12% to €491

¹⁰ "BMW Motorrad and TomTom" (TomTom website: <https://www.tomtom.com/customers/bmw-motorrad/>)

¹¹ "Sygic and TomTom" (TomTom website: <https://www.tomtom.com/customers/sygic-and-tomtom/>)

million.¹² The automotive sector, a crucial component of TomTom's business, saw operational revenue surge by 16% to €343 million.¹³

Over and above, TomTom is positioning for continued growth in its location technology revenue, supported by a robust sales funnel for its Orbis Maps and a positive forecast for the enterprise segment. Orbis Maps ensures seamless software upgrades for vehicles across all automation levels. The company empowers vehicles to elevate their navigation and driving capabilities by integrating semantic layers over existing ADAS maps, aligning with advanced automation requirements.

Lastly, TomTom aims for €600 million in location technology revenue by 2025, alongside a free cash flow target of 10% of group revenue.¹⁴ Overall, the financial achievements of 2023 underscore the company's commitment to innovation, strategic investments, and the widespread allure of its location technology and mapping services across various markets.

Conclusion

Customer-centric strategies are pivotal for maintaining market leadership, requiring both authenticity in their approach and flawlessness in execution. TomTom embodies this principle with a diverse portfolio, including partnerships with over 30 car brands and deploying its advanced driver assistance systems in 14 million vehicles. The company's ability to innovate in speed assist, lane control, and comprehensive high-definition maps showcases state-of-the-art technology that enhances the driving experience across various vehicle brands such as Stellantis, Daimler, BMW Motorrad, and Volkswagen.

Furthermore, TomTom responds to the immediate needs of its diverse customer base and anticipates future demands, ensuring its solutions are scalable and adaptable to advancements in vehicle automation and technology. This foresight and a hands-on approach to innovation and problem-solving solidifies the company's reputation as a leader in delivering customer-centric mapping solutions.

With its strong overall performance, TomTom earns Frost & Sullivan's 2024 Global Customer Value Leadership Award in the automotive map industry.

¹² "Fourth Quarter and Full Year 2023 Results" (TomTom press release, February 2024)

¹³ Ibid.

¹⁴ Ibid.

What You Need to Know about the Customer Value Leadership Recognition

Frost & Sullivan's Customer Value Leadership Award recognizes the company that offers products or services customers find superior for the overall price, performance, and quality.

Best Practices Award Analysis

For the Customer Value Leadership Award, Frost & Sullivan analysts independently evaluated the criteria listed below.

Business Impact

Financial Performance: Strong overall financial performance is achieved in terms of revenues, revenue growth, operating margin, and other key financial metrics

Customer Acquisition: Customer-facing processes support efficient and consistent new customer acquisition while enhancing customer retention

Operational Efficiency: Company staff performs assigned tasks productively, quickly, and to a high-quality standard

Growth Potential: Growth is fostered by a strong customer focus that strengthens the brand and reinforces customer loyalty

Human Capital: Commitment to quality and to customers characterize the company culture, which in turn enhances employee morale and retention

Customer Impact

Price/Performance Value: Products or services provide the best value for the price compared to similar market offerings

Customer Purchase Experience: Quality of the purchase experience assures customers that they are buying the optimal solution for addressing their unique needs and constraints

Customer Ownership Experience: Customers proudly own the company's product or service and have a positive experience throughout the life of the product or service

Customer Service Experience: Customer service is accessible, fast, stress-free, and high quality

Brand Equity: Customers perceive the brand positively and exhibit high brand loyalty

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The Growth Pipeline Engine™

Frost & Sullivan's proprietary model to systematically create ongoing growth opportunities and strategies for our clients is fuelled by the Innovation Generator™.

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Key Impacts:

- **Growth Pipeline:** Continuous Flow of Growth Opportunities
- **Growth Strategies:** Proven Best Practices
- **Innovation Culture:** Optimized Customer Experience
- **ROI & Margin:** Implementation Excellence
- **Transformational Growth:** Industry Leadership



The Innovation Generator™

Our 6 analytical perspectives are crucial in capturing the broadest range of innovative growth opportunities, most of which occur at the points of these perspectives.

Analytical Perspectives:

- Mega Trend (MT)
- Business Model (BM)
- Technology (TE)
- Industries (IN)
- Customer (CU)
- Geographies (GE)

