

Technology Leadership Award

Aftermarket Alternative Traction Devices

NORTH AMERICA



Background and Company Performance

Industry Challenges

Winter driving is a treacherous affair. Roads with snow and ice can be extremely dangerous, as drivers can easily lose control over their vehicles, leading to possibly fatal accidents.

In order to mitigate the situation, drivers have been using snow chains for over 100 years on a variety of vehicles and terrains. Snow chains are devices that are designed to cover the tire and aid in traction on snow, mud, or icy surfaces by digging into the ground. However, Frost & Sullivan research shows that advancements in the design of snow chains have not kept pace with other innovative developments in the automotive industry.

Due to their metal construction, snow chains are neither resilient, nor do they adapt to vehicle load and road conditions. They are unable to change their shape and therefore break in the event of excessive load or tire wear. Driver may also forget to remove these chains or drive too quickly on dry tarmac surfaces, exacerbating the damage. In the event that chains break under operation, they can cause severe damage to the vehicle body and system parts. They also cause damage to the tires of other road users when they are strewn across the road during fragmentation, creating a critical safety issue. Furthermore, Frost & Sullivan points out that many original equipment manufacturers (OEMs) will even void a vehicle's warranty in the event that owners attach tire chains when driving in winter conditions.

The recommended maximum speed suggested by chain manufacturers is generally within 30 km/h to 50 km/h. Driving on dry or hot roads with chains can cause a vehicle to slide during braking or even prevent the anti-lock braking system (ABS) from functioning effectively. Some chain manufacturers also recommend the tightening of chain linkages after driving short distances to check for tightness, which can be a tedious process for drivers.

Alternative solutions to snow chains that vehicle owners and drivers prefer to use include snow or winter tires. Several Tier I suppliers manufacture snow tires for optimum vehicle operation on snow or icy roads. However, Frost & Sullivan notes that there are several drawbacks with these specialised solutions. One issue is that they are expensive; snow tires from a leading manufacturer range between \$100 and \$400, depending on the size of the tire. These tires can only be used on snow or icy roads, as they disintegrate quite rapidly under dry or hot tarmac surfaces.

Technology Leverage and Business Impact

Commitment to Creativity

Tony Bright initially conceived the idea for Flex-Trax. Properly realizing that conventional tire chains are rudimentary and not particularly efficient at driving in the snow, he came up with the concept of the Flex-Trax.

Using coat hangers as the interlinking elements and a waffle iron to melt rubber into a specific design pattern, Tony developed the prototype for the first even snow tire track. He tested the system on his vehicle and was successful at using it in the snow. Through the years and after several iterations with continuous improvement, Tony patented the design and called it Flex-Trax technology. Using this technology, he then launched the GoClaw system for mud and snow road driving. His latest iteration is the SnoClaw system, which has a modified ratcheting strap system.

Frost & Sullivan ongoing analysis confirms that the main difference between the Flex-Trax and other products in the market is that the vehicle does not need to be lifted/jacked up to attach them to the wheel. The products can be attached even when the vehicle is stuck. The products are also self-cleaning. When the wheels rotate, the unique design of the product pushes out debris (including snow and mud), thereby providing continuous and optimal grip.

Commitment to Innovation

Patent Development Company, LLC owns the trademark and patent license for the Flex-Trax. Flex-Trax is marketed as an alternative traction device in a market that is currently flooded with companies manufacturing and marketing seasonal tires and chain links.

Frost & Sullivan agrees that this technology is one of the very first specialist and innovative devices in the market. It has patented omni-directional chambers that are able to capture mud/snow and displace it during tire rotation. The GoClaw system can be used on snow and muddy terrains to obtain maximum traction. This system is able to be accommodated in large wheel wells, despite having wide locking pins. However, as cars have evolved, smaller vehicles have been designed with reduced wheel well clearance. As such, the SnoClaw system (with its simpler and thinner ratcheting straps) was developed. It is able to accommodate the smaller wheel well, without causing damage to the vehicle.

Another major advantage of these products is that they can be left on even when the vehicle is being driven on dry surfaces, pavement, or tarmac.

Commercialization Success

Frost & Sullivan monitors other companies in the market that offer alternative solutions to snow chains or all weather tires. Autosock AS, a Norwegian company that prides itself in developing specific snow solutions, created the car tire snow socks. It is certified in several countries for public use, and the product is offered for several applications in the market, including commercial vehicles. However, a major disadvantage is its installation process and outright performance in snow.

Multinational tire companies, such as Michelin, develop specific winter weather tires to account for snow or icy road situations. However, due to their higher prices and extremely limited application surfaces, customers are not inclined to purchase these tires. Flex-Trax is able to nicely fill in the gaps between application and cost efficiency.

The mission of the advanced Flex-Trax technology was to change the way drivers manage snow situations while ensuring maximum safety. With a one minute installation time expected per vehicle, the system is able to offer maximum traction with minimal effort. Since being introduced in 2005, the company has seen significant growth and had its best year yet in 2015. The company was able to leverage restrictions on snow chains and materials by selling SnoClaws to municipalities for their vehicles and even to emergency vehicles - such as fire trucks and ambulances.

Application Diversity

Flex-Trax technology is available on two different products, the GoClaws and SnoClaws. Patent Development Company, LLC sells each product within a range of different tire sizes in order to fit a diverse range of vehicles. From compact cars to 4WD vehicles, each of these products allow simple installation by customers. The company also offers detailed and descriptive customer support manuals on installation, thereby ensuring complete customer satisfaction when they are purchased and used.

Snow chains have been in the market for more than 100 years with little improvement. The Flex-Trax technology in the GoClaw and SnoClaw forms provides for self-cleaning, self-tensioning, and positive locking. As the vehicle is driven with these solutions, the system enables extended traction on mud or snow surfaces, without compromising on safety or vehicle control. It is intended to be as user friendly as possible, without the need for extra tooling; the expected life expectancy of the product is estimated at nearly ten times that of the competition.

Growth Potential

Many customers who have used the GoClaws or SnoClaws have reported an approximate 6 to 8 year service life, which is much more than is offered by other snow driving solutions. Through continual improvement, the latest generation of the Flex-Trax system utilizes polyurethane, which is easy to handle and more resistant to wear and tear.

The market for alternative traction devices has huge potential for growth. First, the geographical area where Flex-Trax technology can be applied is vast. Customers in countries that experience harsh winter conditions are prime customers for this sort of technology. Even customers in rural or tropical climates that require additional tire traction can use the GoClaw system for vehicle operation. Second, the types of customers that could use this technology is diverse. Municipality vehicles, such as cleaning trucks and emergency vehicles like fire trucks, are some of the public service vehicles that can utilise Flex-Trax technology.

Operational Efficiency

Initially, GoClaws were the flagship product for Patent Development Company, LLC but continual development has led to the SnoClaws. The company actively asks for customer feedback to continuously improve its products. It has also recently undertaken a recycling program, where customers with unused Flex-Trax products can return them to the company for recycling; materials are used in new products.

Considering that Patent Development Company, LLC is a family-run business, the time taken for business decisions to be implemented is quite fast, as the company does not face any bureaucratic hurdles. All products are completely manufactured in house. The company also markets products to commercial enterprises that are involved in field operations (including municipalities, gas companies, and telephone companies). With the foundation of increased sales year-on-year, the company is looking to 2016 to further improve on its 2015 performance.

Conclusion

The associated risks of driving in snow or icy road conditions cannot be underestimated or understated. Drivers can lose control over their vehicles, and accidents can lead to fatalities. It is therefore critical that drivers take extreme care when driving under these conditions and do whatever possible to ensure road safety. The Flex-Trax technology developed by Patent Development Company, LLC offers drivers a cost-effective, simple, and, most importantly, safe solution for winter driving. Frost & Sullivan firmly believes that the GoClaw and SnoClaw products are the best solution for their vehicles. With its strong overall performance, Patent Development Company, LLC has earned the 2016 Frost & Sullivan Technology Leadership Award.

Significance of Technology Leadership

Technology-rich companies with strong commercialization strategies benefit from the increased demand for high-quality, technologically innovative products. Those products help shape the brand, leading to a strong differentiated market position.



Understanding Technology Leadership

Technology Leadership recognizes companies that lead the development and successful introduction of high-tech solutions to customers' most pressing needs, altering the industry or business landscape in the process. These companies shape the future of technology and its uses. Ultimately, success is measured by the degree to which a technology is leveraged, and the impact that technology has on growing the business.

Key Benchmarking Criteria

For the Technology Leadership Award, Frost & Sullivan analysts independently evaluated two key factors—Technology Leverage and Business Impact—according to the criteria identified below.

Technology Leverage

- Criterion 1: Commitment to Innovation
- Criterion 2: Commitment to Creativity
- Criterion 3: Technology Incubation
- Criterion 4: Commercialization Success
- Criterion 5: Application Diversity

Business Impact

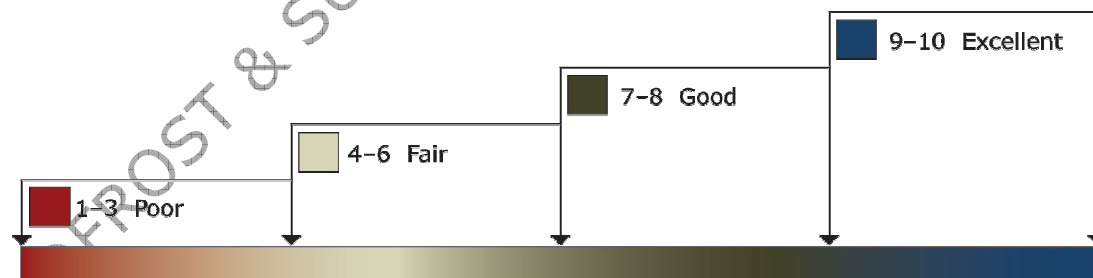
- Criterion 1: Financial Performance
- Criterion 2: Customer Acquisition
- Criterion 3: Operational Efficiency
- Criterion 4: Growth Potential
- Criterion 5: Human Capital

Best Practice Award Analysis for Patent Development Company, LLC

Decision Support Scorecard

To support its evaluation of best practices across multiple business performance categories, Frost & Sullivan employs a customized Decision Support Scorecard. This tool allows our research and consulting teams to objectively analyse performance, according to the key benchmarking criteria listed in the previous section, and to assign ratings on that basis. The tool follows a 10-point scale that allows for nuances in performance evaluation; ratings guidelines are illustrated below.

RATINGS GUIDELINES



The Decision Support Scorecard is organized by Technology Leverage and Business Impact (i.e., the overarching categories for all 10 benchmarking criteria; the definitions for each criteria are provided beneath the scorecard). The research team confirms the veracity of this weighted scorecard through sensitivity analysis, which confirms that small changes to the ratings for a specific criterion do not lead to a significant change in the overall relative rankings of the companies.

The results of this analysis are shown below. To remain unbiased and to protect the interests of all organizations reviewed, we have chosen to refer to the other key players as Competitor 2 and Competitor 3.

DECISION SUPPORT SCORECARD FOR TECHNOLOGY LEADERSHIP AWARD

<i>Measurement of 1-10 (1 = poor; 10 = excellent)</i>			
Technology Leadership	Technology Leverage	Business Impact	Average Rating
Patent Development Company, LLC	10.0	9.0	9.5
Competitor 2	8.0	7.0	7.5
Competitor 3	5.0	5.0	5.0

Technology Leverage

Criterion 1: Commitment to Innovation

Requirement: Conscious, on-going development of an organization culture that supports the pursuit of ground-breaking ideas through the leverage of technology

Criterion 2: Commitment to Creativity

Requirement: Employees rewarded for pushing the limits of form and function, by integrating the latest technologies to enhance products

Criterion 3: Technology Incubation

Requirement: A structured process with adequate investment to incubate new technologies developed internally or through strategic partnerships

Criterion 4: Commercialization Success

Requirement: A proven track record of successfully commercializing new technologies, by enabling new products and/or through licensing strategies

Criterion 5: Application Diversity

Requirement: The development of technologies that serve multiple products, multiple applications, and multiple user environments

Business Impact

Criterion 1: Financial Performance

Requirement: Strong overall financial performance in terms of revenues, revenue growth, operating margin and other key financial metrics

Criterion 2: Customer Acquisition

Requirement: Overall technology strength enables acquisition of new customers, even as it enhances retention of current customers

Criterion 3: Operational Efficiency

Requirement: Staff is able to perform assigned tasks productively, quickly, and to a high quality standard

Criterion 4: Growth Potential

Requirements: Technology focus strengthens brand, reinforces customer loyalty and enhances growth potential

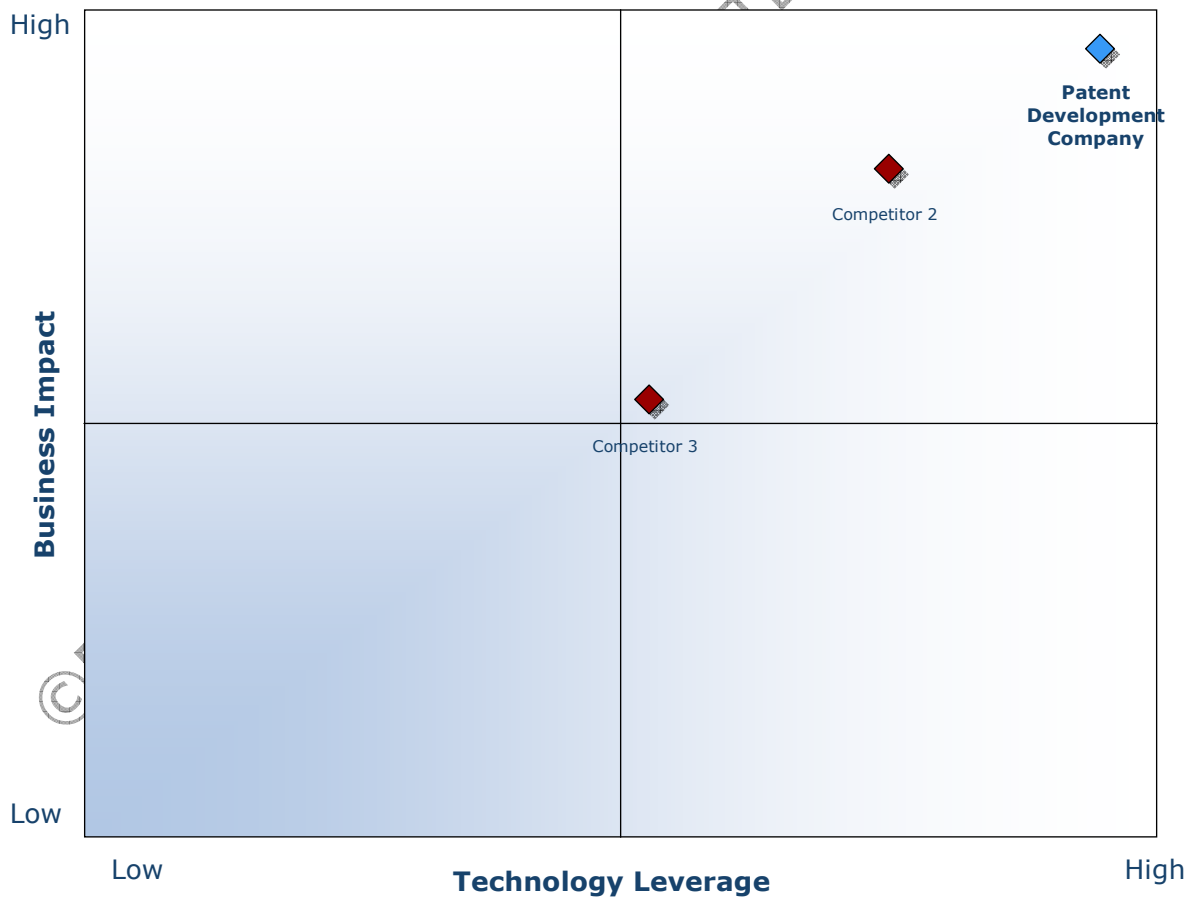
Criterion 5: Human Capital

Requirement: Company culture is characterized by a strong commitment to customer impact through technology leverage, which in turn enhances employee morale and retention

Decision Support Matrix

Once all companies have been evaluated according to the Decision Support Scorecard, analysts can then position the candidates on the matrix shown below, enabling them to visualize which companies are truly breakthrough and which ones are not yet operating at best-in-class levels.

DECISION SUPPORT MATRIX FOR TECHNOLOGY LEADERSHIP AWARD



The Intersection between 360-Degree Research and Best Practices Awards

Research Methodology

Frost & Sullivan’s 360-degree research methodology represents the analytical rigor of our research process. It offers a 360-degree-view of industry challenges, trends, and issues by integrating all 7 of Frost & Sullivan’s research methodologies. Too often, companies make important growth decisions based on a narrow understanding of their environment, leading to errors of both omission and commission. Successful growth strategies are founded on a thorough understanding of market, technical, economic, financial, customer, best practices, and demographic analyses. The integration of these research disciplines into the 360-degree research methodology provides an evaluation platform for benchmarking industry players and for identifying those performing at best-in-class levels.

360-DEGREE RESEARCH: SEEING ORDER IN THE CHAOS



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Best Practices Recognition: 10 Steps to Researching, Identifying, and Recognizing Best Practices

Frost & Sullivan Awards follow a 10-step process to evaluate Award candidates and assess their fit with select best practice criteria. The reputation and integrity of the Awards are based on close adherence to this process.

STEP	OBJECTIVE	KEY ACTIVITIES	OUTPUT
1 Monitor, target, and screen	Identify Award recipient candidates from around the globe	<ul style="list-style-type: none"> • Conduct in-depth industry research • Identify emerging sectors • Scan multiple geographies 	Pipeline of candidates who potentially meet all best-practice criteria
2 Perform 360-degree research	Perform comprehensive, 360-degree research on all candidates in the pipeline	<ul style="list-style-type: none"> • Interview thought leaders and industry practitioners • Assess candidates' fit with best-practice criteria • Rank all candidates 	Matrix positioning all candidates' performance relative to one another
3 Invite thought leadership in best practices	Perform in-depth examination of all candidates	<ul style="list-style-type: none"> • Confirm best-practice criteria • Examine eligibility of all candidates • Identify any information gaps 	Detailed profiles of all ranked candidates
4 Initiate research director review	Conduct an unbiased evaluation of all candidate profiles	<ul style="list-style-type: none"> • Brainstorm ranking options • Invite multiple perspectives on candidates' performance • Update candidate profiles 	Final prioritization of all eligible candidates and companion best-practice positioning paper
5 Assemble panel of industry experts	Present findings to an expert panel of industry thought leaders	<ul style="list-style-type: none"> • Share findings • Strengthen cases for candidate eligibility • Prioritize candidates 	Refined list of prioritized Award candidates
6 Conduct global industry review	Build consensus on Award candidates' eligibility	<ul style="list-style-type: none"> • Hold global team meeting to review all candidates • Pressure-test fit with criteria • Confirm inclusion of all eligible candidates 	Final list of eligible Award candidates, representing success stories worldwide
7 Perform quality check	Develop official Award consideration materials	<ul style="list-style-type: none"> • Perform final performance benchmarking activities • Write nominations • Perform quality review 	High-quality, accurate, and creative presentation of nominees' successes
8 Reconnect with panel of industry experts	Finalize the selection of the best-practice Award recipient	<ul style="list-style-type: none"> • Review analysis with panel • Build consensus • Select winner 	Decision on which company performs best against all best-practice criteria
9 Communicate recognition	Inform Award recipient of Award recognition	<ul style="list-style-type: none"> • Present Award to the CEO • Inspire the organization for continued success • Celebrate the recipient's performance 	Announcement of Award and plan for how recipient can use the Award to enhance the brand
10 Take strategic action	Upon licensing, company may share Award news with stakeholders and customers	<ul style="list-style-type: none"> • Coordinate media outreach • Design a marketing plan • Assess Award's role in future strategic planning 	Widespread awareness of recipient's Award status among investors, media personnel, and employees

About Frost & Sullivan

Frost & Sullivan, the Growth Partnership Company, enables clients to accelerate growth and achieve best in class positions in growth, innovation and leadership. The company's Growth Partnership Service provides the CEO and the CEO's Growth Team with disciplined research and best practice models to drive the generation, evaluation and implementation of powerful growth strategies. Frost & Sullivan leverages almost 50 years of experience in partnering with Global 1000 companies, emerging businesses and the investment community from 31 offices on six continents. To join our Growth Partnership, please visit <http://www.frost.com>.

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For information regarding permission, contact Nathan Halabrin at:

Best Practices Group

Frost & Sullivan

7550 IH 10 West, Suite 400

San Antonio, TX 78229-5616 USA