



**DivgiWarner**  
*the spirit of innovation*

# Innovation **TIMES**

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## **THE STRUCTURE OF DISRUPTIVE INNOVATIONS**



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It's great to be back again with another issue of *Innovation TIMES*. Significantly, this is our 10th anniversary and we are thrilled and gratified that we have sustained this effort over the last 10 years.

There is widespread hope and expectation that India is on the cusp of another great leap forward economically. Indian demographics fuelling demand and global technology are expected to fuse and synthesize to bring paradigm shifts in India that could have global ripple effects. In a world driven by hyper-connectivity and the technology of social media, India's stature as the world's largest free market democracy is increasingly being seen as a strength for positive social and political change, especially when compared to the irreconcilable conflict and turbulence in many other parts of the world. The ecosystem seems ripe for increasing disruptive trends that can overturn the comfort zones of the status quo.



Contrary to prevailing wisdom, the history of the last twenty years shows that marketplace disruption is not the exclusive preserve of the underdog David felling the unsuspecting Goliath; rather, it is increasingly the result of the collaboration between, if I may be permitted the linguistic licence, Davidian tactics and Goliathan technology and strength. Local entrepreneurial insight and the strategic foresight of agnostic global capital are further catalysts in this cauldron.

Seen systemically, disruptive innovations seem to follow a certain pattern. The normative state-of-the-art in any industry or sector of the economy with a certain paradigm based on previous accomplishments and successes is dedicated to the mantra of continuously improving customer experience. The *paradigm* is the most critical element – Clayton Christensen of Harvard called it a composite world view of *customer value*, the *resources* required to drive forward the frontiers of customer experience, and the *processes* that are in place to execute the application of resources and drive the continual improvement. Given the rapid rate of change, paradigms nowadays are not accurate representations of what is required to get the job done. The application of inadequate paradigms leads to serious *anomalies* of leaving key needs unfulfilled. These unfulfilled needs fester to the point that an acute crisis is precipitated in the marketplace. Finally, the resolution of the crisis is what we see as an innovation that leads to a new paradigm, a new normal, something we now call a *paradigm shift*.

This 'structure' or conception of disruptive innovation has significant implications. The organization needs appropriate market sensing and analysis to keep its paradigm or world view accurate. The practice of elevating 'principles' to the level of hallowed theological dogma can be the first symptom of getting primed for disruption by faster, more agile competitors who are learning faster. What the outside world sees as glamorous innovation is in reality perhaps a combination of *internal competence-building* across the organization and *non-stop market sensing and experimentation to continually learn* what is appropriate.

The humbling conclusion of this 'structure' is that success in innovation is not a simple straight line path paved by resources and processes. Seen in another way, it is more progress away from less adequate conceptions of, and interactions with, the customer and the marketplace.

Best wishes,

**Jitendra Divgi**  
Managing Director

## ▶▶ Steel & Velvet Feel

# FEATURE STORY

### DivgiWarner delivers dramatic shift-feel improvement through its Dual Cone and Triple Cone Synchronizer Solutions

Since early 2013, DivgiWarner began receiving feedback from our technician community that drivers of Tata and Mahindra models felt that shift-feel was much “stickier” (higher effort to shift gear) on models fitted with brass synchronizers than on the Safari Storme, Xenon XT, Scorpio, Xylo, Quanto and XUV500 that were fitted with DivgiWarner’s superior technology steel-synchronizers<sup>1</sup>

**Contributor:** Sadashiv Manjari  
Sales & Customer Support



NGT520 with Brass Synchronizer Rings



NGT520 with Steel Synchronizer Rings

Particularly on performance, customer feedback on similar shift-feel improvement exercises conducted on vehicles with different configurations of DivgiWarner synchronizers – single cone, dual cone and triple cone – has been very encouraging when compared with conventional brass synchronizers.

“लय त्रास होतो साहेब. त्रोंपिक मधी हाथ मोडूनच जातात बघा” said Mr. Appasaheb Zanjad, a Bhosari based transporter.

This set us thinking. We replaced the existing Single Cone Brass Synchronizer Rings in the 1st – 2nd gear positions of a Mahindra Bolero Pick-Up Truck equipped with an NGT520 Transmission with the DivgiWarner ‘Velvet-Feel’ Dual Cone Steel Synchronizer Rings Kit. The simple plug-&-play replacement activity with absolutely no changes in any manner to other units in the vehicle required just about two hours of vehicle down-time. The vehicle was then test-driven by several people. And the results are for all to hear.....

“अच्छे दिन आ गए” (good days have arrived) Appasaheb commented after the change.

“I did not realize that it takes a real hard push to get the gear into the correct position until I experienced the shift with the Gear-Shift Improvement Kit from DivgiWarner. The improvement is very noticeable, very real”, Shekhar Dandekar, a Kothrud based interior designer said.



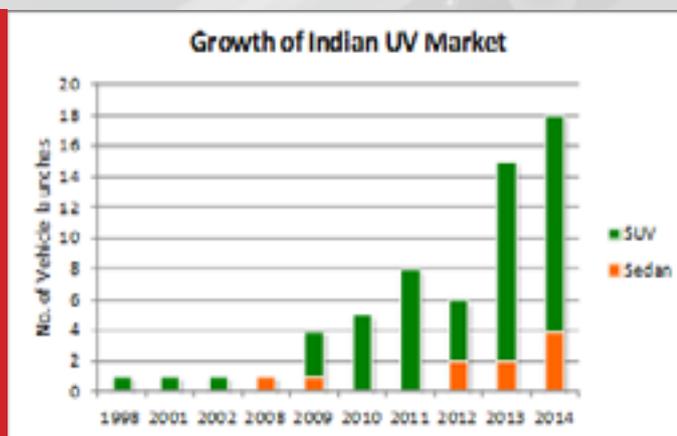
Shri Appasaheb Zanjad with his Mahindra Bolero Pick-up

1 In the “Technology News” section of our Quarterly Newsletter, Innovation Times Issue 34, published in May, 2014, we had mentioned how DivgiWarner recognized the inherent advantages of steel based synchronizers over the brass-based design and since 2010 has grown to become the biggest steel synchronizer systems supplier to the utility car segment in India.

### DivgiWarner sees a burgeoning market for itself in the automakers' "Four-metre" race

**Contributor:** Gajanan Chitale  
Sales & Customer Support

Until 2006, all models of sedans and UVs in India were more than 4 metres long. In 2006, the then Finance Minister P C Chidambaram, in a bid to boost local production and to promote India as a global small car manufacturing hub, proposed an excise duty reduction across all categories of vehicles in the Union Budget.



As expected, the reduction created the required flutter amongst all auto manufacturers who were elated on the positive impact the reduction would have on their respective businesses. But it was the eight percentage point reduction provided for vehicles under 4 metres in length and with petrol engines less than 1200cc or diesel engines smaller than 1500cc, that generated the maximum buzz. Car makers rubbed their hands in glee. The new tax structure effectively created for them an entirely new "Sub-Four" category of vehicles and opened the floodgates for manufacturers from across the world to make a beeline to India to launch cars under 4 metres long. For customers in India, the new launches of sub-four vehicles provided an option of upgrading their cars and satisfying their desires of a dream vehicle while keeping their spending in check.

The segments that benefitted the most were the compact sedan segment and the mini SUV segment. The first of such under-4 metre vehicle was the "Indigo CS" (Compact Sedan) from Tata Motors in 2008 with a price lower by a whopping Rs. 50,000/- than others in the category. That sent other OEMs scurrying back to their drawing boards to redraw their strategies. But still, it took most of them around three years to exploit the "under-4 metre rule" and come up with new compact saloons and utility vehicles under 4metres.

Vehicles with Length under 4-metres	
Company	Model
TATA	Indigo CS
	Zest
Maruti	Swift Dzire
Ford	Ecosport
Honda	Amaze
Premier	Rio
Hyundai	Xcent
Mahindra	Thar
	Quanto

Since 2011, there has been a steady stream of new compact sedans and SUVs being introduced in India. With further excise duty cut on automotives announced in the Union Budget of 2014, car makers continue to revel under the sun and competition, particularly in the compact saloon and SUV (sports utility vehicle) segments, continues to remain stiff to this date.

For DivgiWarner, it couldn't get any better. After all, any AWD version of any SUV, irrespective of its length becomes a candidate for DivgiWarner's transfer case or torque coupler. DivgiWarner (and the entire Indian auto industry) therefore, hopes that the excise-duty concessions will continue under the new Government formed in May, 2014.

Till such time, with a variety of choices in compact sedan and SUV segments at prices that fit their pockets, the customer can truly be spoiled for choice.

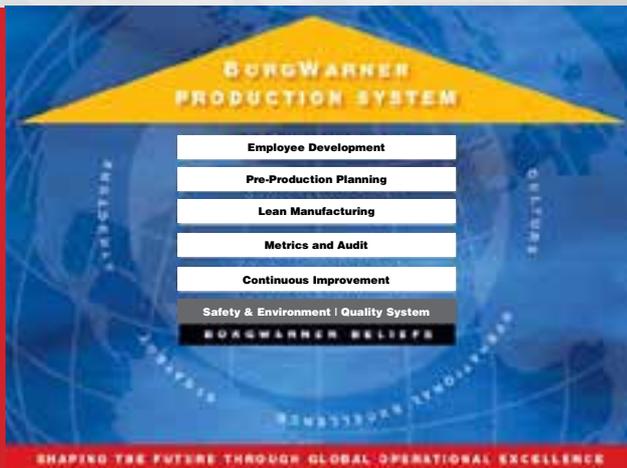
# ▶▶ Five's the Limit

# EVENTS

## DivgiWarner progresses steadily towards its Vision in automotive drivetrain components and systems

The automotive industry has always been the “beehive” of technological innovations and has always set very strong standards of excellence to itself and its community of suppliers in production processes.

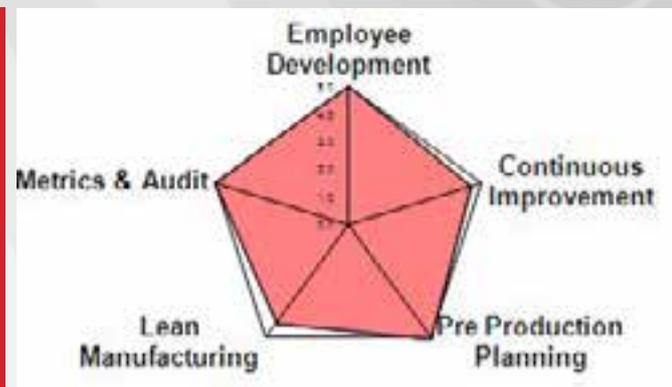
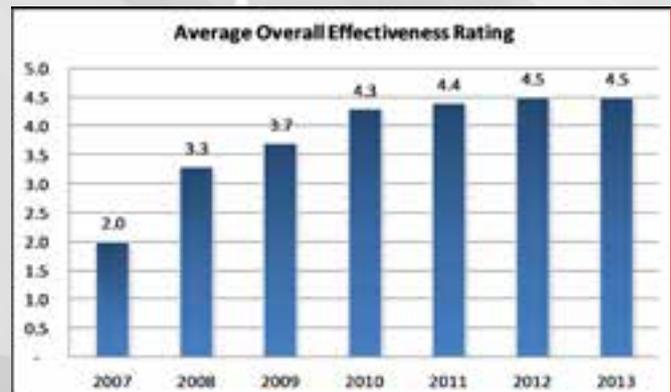
**Contributor:** Sudhindra Deshpande  
*Operations*



in November, 2008 on the two foundational elements viz. Safety and Environment and Quality Systems and each of the five pillars of the system viz. Continuous Improvement, Metrics and Audits, Lean Manufacturing, Pre-Production Planning and Employee Development saw DivgiWarner winning the BWPS Trophy for the best implementation across all plants.

Since then, DivgiWarner has steadily moved up the implementation ladder from Level 2 to Level 4.5 on scale of 5\* in 2013 making significant improvements year on year on the twenty-three tactical strategies built upon the foundational elements and the pillars of implementation of the BWPS.

With its Vision set on being recognized as a world-class Indian brand in automotive drivetrain components and systems, DivgiWarner began its pursuit of manufacturing excellence when BorgWarner, in April, 2008, kick-started at all of its 64 units world-wide, the Borg Warner Production System (BWPS) initiative; the implementation of an integrated socio-technical system adapted from the robust Toyota Production System that strives to continually improve standard processes and procedures, so as to ensure maximum quality, improve efficiency and eliminate waste within the manufacturing processes.



### Eight Types of Wastes

- Overproduction
- Inventory
- Transportation
- Motion (Operations)
- Processing
- Defects / Quality
- Slack Time
- People Skills

An evaluation on the progress of the BWPS implementation conducted at all of the above plants within seven months,

### \*Levels of implementation:

Level 1: Ineffective | Level 2: Developmental | Level 3: Basic | Level 4: Standard | Level 5: World Class

A mind-share with stalwarts within our workforce

**Contributor:** Gopal Dalvi  
Human Resources



### Muralidhar Dattatraya Nagarkatte

Management Representative for Quality systems

<b>Education:</b>	Diploma in Mechanical Engineering.
<b>Total Experience:</b>	17 Years
<b>With Divgi Warner:</b>	7 years
<b>Career goals:</b>	To be a successful professional with knowledge, experience and leadership skills and deliver best results to the organization
<b>Hobbies:</b>	Listening to music, watching television shows and playing cricket and badminton
<b>Family details:</b>	Spouse: shilpa Daughters: shrinidhi & sannidhi

#### What is your current role in DivgiWarner?

I work as a Management representative for Quality systems and leading the role in Operational Excellence. My job profile covers implementation and monitoring Quality, Environment & Production Management systems across the organization.

#### What has been your experience with DivgiWarner?

In my 7 years of work experience with DivgiWarner, I got the opportunity to learn & excel in the areas of Production & Quality Systems. I have been exposed to the setting of Synchronizer assembly unit by leading the team & constructing a strong baseline. The implementation of TS 16949, ISO 14001 and BorgWarner Production System (BWPS) and successfully driving the Alliance Supplier Evaluation Standard (ASES) initiative of Nissan was a unique experience for me in my career profile. It all helped me to develop my skills and ability in the areas of process improvements, system culture building, problem solving and people management.

The regular training held in the company such as the Management Development Program (MDP), QS core tool trainings, etc. have also helped me gain and update my product and industry knowledge.

#### What has been your contribution to DivgiWarner's Product Leadership Initiatives?

The development of upper output shaft for Torque on Demand (TOD) Transfer case, Synchro parts machining and the establishing of synchronizer assembly unit at Sirsi plant are the areas where I feel that I contributed at my best level.

Also played a leading role in implementation of BWPS & Rank up improvement for Alliance Supplier Evaluation Standard (ASES) and Implementation of Quality System Basics (QSB).

#### What do you believe are some of your notable achievements at DivgiWarner?

- Implementation of Environment Management System, authoring a paper on Quality System Basics published by the SAE and spearheading the set-up of the Synchronizer Assembly Unit at Sirsi have been the assignments that have given me a great amount of personal satisfaction.

## ▶▶ Forward Thrust

### **NexTrac® , the Front-Wheel Drive Based All-Wheel Drive System from DivgiWarner delivers Enhanced Stability, Traction and Fuel Economy**

In 2008, BorgWarner introduced the NexTrac® All-Wheel Drive Coupling, a high-performance, electronically controlled, all-wheel drive system designed to meet the growing front-wheel drive based crossover, sport-utility and passenger car vehicles market. Born from BorgWarner's experience in producing over 1,000,000 AWD clutches since 1998, the NexTrac® system is currently the latest generation in electro-magnetic actuation utilizing a unique design for direct actuation of the primary clutch providing best-in-class lifetime NVH performance.

**Contributor:** Avinash Kurdekar  
Product Engineering

the rear wheels as needed to maintain traction and handling. This unique actuation system allows the use of organic friction material in the primary clutch for a consistent, smooth and quiet response. The NexTrac® coupling features a lightweight aluminum clutch housing as well as individually tuned primary and secondary clutches for best-in-class drag torque performance, which contributes to better fuel economy.

**Ford Ecosport**



The NexTrac® technology provides enhanced stability and traction as it is engineered to actively manage torque, anticipate loss of traction and respond to changing driving conditions. Compared with rear-wheel drive based systems, the NexTrac® coupling provides greater fuel economy due to a much lighter and lower cost front-wheel drive based all-wheel drive system.



The Mahindra XUV500 is the first domestic vehicle in India to feature a front-wheel drive based all-wheel drive system utilizing the NexTrac® System. The stability and traction superiority of the Mahindra XUV500 over other vehicles in that category is attributed to the NexTrac® on-demand all-wheel drive technology and, as per the feedback from our technician community, has been endorsed by drivers of the Mahindra XUV500 time and again.

With the perceptible world-wide shift in customer preference to **Front-Wheel Drive Based All-Wheel Drive Systems** and the proven NexTrac® technology available on the Mahindra XUV500 since 2011 in India, vehicles of the likes of Renault Duster and Ford Ecosport are perfect candidates for the introduction of this technology in the immediate future.

**Renault Duster**



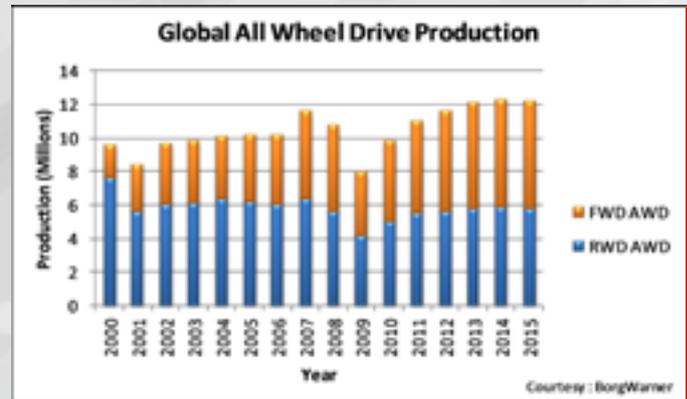
Based on input from vehicle sensors to the electronic control unit, the NexTrac® coupling uses electro-magnetic actuation to directly engage the primary clutch system, which then amplifies the actuation force on the secondary clutch, automatically redistributing torque from the front wheels to



### NexTrac® Support Cell to address future support requirements for the product in India



**Contributor:** Avinash Kurdekar  
Product Engineering



In an era that is constantly compelling automakers around the world to effect cost competitive solutions, Front Wheel Drive (FWD) technology has come in as the perfect solution over rear wheel technology. The steady increase in the demand for FWD vehicles since the early 2000s triggered significant technology changes to the AWD technologies prevailing at that time.

Born out of this demand, in 2008, was Borgwarner's Nextrac® System – the latest product in the i-Trac series created exclusively for FWD/AWD products. The NexTrac® System, a high-performance, electronically controlled, all-wheel drive system designed to meet the growing front-wheel-drive-based crossover, sport-utility and passenger car vehicle markets was engineered from BorgWarner's experience in producing over 1,000,000 AWD clutches since 1998 and debuted on the Hyundai Santa Fe, Tucson and KIA Sportage.



Mahindra introduced the BorgWarner NexTrac® on its first FWD application, the XUV500 in September 2011. DivgiWarner was entrusted with the task of supporting the product in India.

DivgiWarner set up the NexTrac® Electronics Test Lab in 2011 at its Bhosari facility for the testing of signal integrity of its Electronic Control Unit (ECU). The signal integrity ensures accurate electronic communication exchange with other ECUs installed in the Mahindra XUV500.

As an extension to the current support being provided and with the confidence of a growing market for FWD based AWD vehicles in India, DivgiWarner has proactively established an assembly line for the NexTrac® at its facility at Bhosari. The prime objective of the Support Cell is to ready

the support engineers on aspects of servicing, assembling and performance testing of the NexTrac® as and when it becomes necessary to address any global or domestic servicing or low volume production requirements. Housed in around 200 sq. ft. floor area within the 1.5 acre facility, the Cell is equipped with an ingeniously designed Test Stand that performs functional as well as End-of-Line Testing ensuring that

the product performs as per specifications on service. Typical operations conducted are assembly of the primary and secondary clutches, assembly of the back plate, flange and nut tightening stations as well as leak and functional testing.

It is hoped that the NexTrac® Support Cell will provide customers in India with an ideal "pit stop" for any support issues that they may face on the NexTrac® on any future applications launched in India.



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