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Analysis of Performance of Bowlers using Combined Bowling Rate

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Abstract. Bowling and batting have always been the most important aspects of the game of cricket. But with advent of the newest version of cricket with twenty overs-a-side the task of the bowlers are believed to have become difficult. This paper attempts to use the combined bowling rate to quantify the performance of a sample of bowlers who participated in the fourth season of the Indian Premier League. Based on relevant literature a set of predictors that can influence the performance of the bowlers were determined. Multiple linear regression technique was then used to identify the reasons that are empirically responsible for the performance of the bowlers. It was also observed that experience of the bowler and combined bowling rate at Tewnty20 internationals are the most significant predictors that are responsible for the performance of bowlers in IPL IV.

Keywords: Combined bowling rate, Cricket, Data Analysis in Sports.

1. Introduction

In the game of cricket, the batsman shall try to score as many runs as he can, without losing his wicket and the bowler's job is to get the batsman out i.e. to dismiss him. In case of limited over games, in addition to dismissing a batsman, the bowler may also try to restrict the batsman from scoring, because the bowler has to bear with a trade off, that he should not give away many runs while experimenting in getting the batsmen out. With the increase in popularity of Tewnty-20 games, the task of bowling has become even tougher. It is been appropriately pointed out by Chopra [3] that, in Tewnty20 cricket the grounds are smaller, wickets flatter, bats thicker and just to make it tougher for bowlers, the format of the game is shorter. Cricket is considered as a batsman's game mainly because most of the cricketing rules are in favor of the batsman allowing them to score more runs. With Tewnty-20 cricket around, the situation seems to get even tougher for the bowlers. The small span of the game ceases to provide the bowler to extract any help from the changing character of the pitch that occurs in longer versions of the game. Also, for faster bowlers the reverse swing will not be seen much as the ball does not get sufficiently old in 20 overs [4]. For a cricket ball to undergo reverse swing, it should be sufficiently rough so that it trips the flow on rough side to turbulence and changes the flow pattern completely to swing in a reverse way. Indian Premier League, which is scheduled in Indian pitches, has made the work of the bowlers even more difficult as most Indian pitches are mostly batsman friendly. In this regard the following comments of different bowlers may seem relevant.

Definitely Twenty20 has forced the bowlers to think more. The batters are coming hard on us to score off every ball and score 150 plus in twenty overs. We need to be quite smart about how we go about our bowling. You have just four overs in this format and you are probably going to bowl two up front and two at the back. So you have to bowl wisely. I think the bowlers are a lot smarter now, compared to the first IPL'[11]. The batsman will always get away even if you are trying to bowl tight. To avoid that, I need to plan in a way where he must look to hit wherever there is a fielder. That is what is called 'bowling to the field'[18].

There are several other stake holders of the game who have seen hope for the bowlers, even in this format. Many are of the opinion that even the bowlers can bring out rabbits off their hat in Tewnty-20 cricket. This paper identifies the factors that actually influence the performance of the bowlers. However, it is essential to determine a measure that can quantify the performance of the bowlers.

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The next section describes one such measure that can be used to measure the performance of the bowler. The third section identifies the factors that may be related to the performance of the bowlers in Tewnty20 cricket. In the absence of any literature focused to the concerned issue, comments of cricketers and cricket writers are considered to identify the factors that may influence the performance of bowlers in this format of cricket. The research methodologies used to identify the factors that are empirically related to the performance of bowlers are discussed in the fourth section along with data source and restrictions. The results and findings are described in the section that followed. The last section concludes the paper along with some relevant discussion and future direction of research in this area.

2. Measuring the Performance of Bowlers

Traditionally, different measures like bowling average, economy rate and bowlers strike rate are used to measure the performance of bowlers.

(i) **Bowling average:** It is the number of runs conceded by the bowler per wicket taken. Thus,

$$\text{Bowling average} = AVG_{BWL} = \frac{\text{Total runs conceded}}{\text{Total wickets taken}} = \frac{r}{w}$$

Where, r = total runs conceded

w = total number of wickets taken

(ii) **Economy Rate:** This measure expresses the runs conceded by the bowler on an average per over. This rate is very important to gauge the performance of a bowler especially in case of limited over cricket.

$$\text{Economy Rate} = ECON_{BWL} = \frac{\text{Total runs conceded}}{\text{Total balls bowled}} \times 6$$

Where, b is the number of balls bowled.

(iii) **Bowler's Strike Rate:** It is defined as the number of balls that a bowler has to bowl to get a wicket. Mathematically, it is the ratio between the number of balls bowled to the number of wickets taken.

$$\text{Bowler's Strike Rate} = SR_{BWL} = \frac{\text{Total balls bowled}}{\text{Total wickets taken}} = \frac{b}{w}$$

But it is widely recognized that such statistics have severe limitations in assessing the true abilities of a player's performance [9]. Also, since the different traditional measures are in different units of measurement so it is difficult to combine them. All these limitations to measure the performance of the cricketers are well discussed [9]. Thus, in order to quantify the performance of bowlers, a measure called as combined bowling rate (CBR) developed by Lemmer [8] is used. This measure is defined to measure the performance of bowlers by combining the above mentioned three traditional measures. Lemmer [8], made an attempt to combine all the three rates to one index. He used the harmonic mean of (i), (ii) and (iii). Harmonic mean is a recommended measure of averaging in case of rates and ratios. But for a harmonic mean one needs to have a common numerator for all the values that are to be averaged. In both (i) and (ii) the numerator is 'Total runs conceded'. It was proposed that (iii) shall be written as,

$$\text{SR}_{\text{BWL}} = \frac{b}{w} = \frac{rb}{rw} = \frac{r}{\frac{rw}{b}}$$

Accordingly the combined bowling rate is defined as

$$\textbf{CBR} = \text{Harmonic mean } (\textbf{AVG}_{\textbf{BWL}}, \textbf{ECON}_{\textbf{BWL}}, \textbf{SR}_{\textbf{BWL}}) = \frac{3}{\frac{w}{r} + \frac{rw}{rb} + \frac{b}{6r}} = \frac{3r}{w + \frac{rw}{b} + \frac{b}{6}}$$

It may be noted that less the value of CBR, better is the bowler.

3. Factors Responsible for the Performance of Bowlers

After identifying a performance measure of bowlers, the next step is to identify the factors or predictors

that have the possibility of influencing the performance of the bowlers. In the absence of any empirical work in this direction the researchers have to depend on the comments of the stake holders of the game to identify the factors responsible for bowling performance. The predictors identified are as follows:

Average Speed: Importance of speed of the cricket ball delivery is quoted by many bowlers. 'The Indian pitches and the small boundary can be very challenging, but you have to back yourself. It is nice to see that many slow bowlers are in the Top-10 list' [19]. 'Bowlers have been adapting and innovating in IPL. The fast bowlers have started using the slow bouncer and spinners have started bowling faster. The trick is in keeping the batsman guessing and that can happen only if you have a mindset to attack' [18]. The faster you come, the faster you go. So, if you slow down the pace of the ball the onus would be on the batsman to hit harder; which means you have created a situation where the batsman has to take the initiative. Let him take the risk' [2]. Such discussion with blowers provided the researchers with a point that speed is going to play an important role in the bowling performance and hence included as one of the pridictors. As some of the IPL players recommend slow bowling, so this variable is initially considered in the analysis. One of the other reasons why slow bowlers have advantage, that they can extract maximum advantage of 'Magnus effect', which is the cause of change the trajectory of ball in flight. Additional circulation imposed on the ball changes the flow pattern around the ball completely and can change the trajectory by enormous amount. Some examples can be top spin, additional flight etc. The speed with which a given bowler is bowling in IPL IV is noted from the live telecast of matches in Sony Max. The values are then averaged to combine them into a single score.

Variation in Ball Speed: Most of the bowlers and eventually researchers know the importance of variation in pace. 'You have to vary your pace. You look to bowl six different balls because in this form of the game one can't really set up a batsman' [10]. 'Definitely Tewnty20 has forced the bowlers to think more in terms of variation and they are a lot smarter now compared to the first IPL tournament [11]. From these comments it is evident that- variation in bowling is almost a necessary element in taming the batsmen in Tewnty-20 cricket. Variation of speed of the ball can also alter the sidewise force the ball can generate in its flight. It was seen that a new ball can generate more normal swings at medium pace (120 kmph) than other speeds [16]. At lower or higher speeds, other factors dominate to reduce swing a ball could obtain. That means, at lower speeds the side forces are not sufficient to generate enough sideward displacement and at high speed, time available for the ball to move sideward is very less. Hence, when ball reaches the other end of the pitch, it undergoes very less amount of sideward displacement. Keeping in mind all these factors, some measures for variation need to be included in the model. Variation in bowling can be in different ways like variation in grip of the ball, bounce, length, speed etc. Since other features are difficult to quantify so variation in speed by the bowler is only considered in the model. The standard deviation of ball speed is used as a measure of variation in ball speed.

Age: The fast bowlers often reach their peak in between early to mid-twenties when they are at the height of their physical prowess. Other bowlers, mostly spinners, even fast bowlers who can "swing" the ball, are most effective in the later part of their career. Thus, a demographic variable measuring the age of the player is included in the model. It is the number of years completed by the player at the start of IPL-IV. Not many veteran players of the game participated in IPL IV. Shane Warne and Muralitharan were the two veteran bowlers of age more than 35. However, these two players are too skilled to be dominated by age. But for other bowlers age may have an impact and hence the variable gets initial consideration.

Type of bowler: Observations which change the established trend in success of bowlers based on their types can be reported. 'In the pre-Twenty20 era these were men who could simply bowl quickly, for a batsman needed special skills to get on top of someone bowling at 145kph. It was widely believed that the shorter the format, the smaller the role of a spinner. In fact, the only way for a spinner to survive in Twenty20 was to bowl quick and flat, or so it was believed for the longest time. But a look at the spinners in action in the current IPL is enough to tell you an entirely different story. Spinners, who bowl slower in the air rule the roost' [3]. 'Spinners deny the batsman pace and if there is adequate 'work' on the ball, the batsman's problem are compounded. The South Africian conditions favoured pace bowling yet spin has been a definite factor in IPL II' [4]. As described earlier, spin bowling can be advantageous because of the Fluid Mechanical aspect of flight of the ball. For spin bowling, many avenues like top spin, googly, underspin open up, which a fast bowler might not employ. With the use of slow bowling speeds, magnus effect (use of circulation on flight of ball) can have tremendous applications in changing the curvature of the ball. 'To my delight, the spinners have made a big impact and with Pragyan Ojha and Muttiah Muralitharan leading the pack in terms of wickets (in IPL III), they have proved that the spinners have a role to play' [14]. Thus, type

of blower is an important predictor. This is characterized into two groups either fast or spin. Medium fast bowlers are considered under the fast bowler category. The code '1' is used for fast bowler and '0' for spin bowler. As most of the discussion on Twenty-20 bowling centers around these two types of bowling, so the model needs to compare them irrespective of their significance.

ODI matches played: Exposure on the cricket players of experience also forms an important parameter of discussion. 'The international cricketers will have an edge over the inexperienced pack'[13]. This variable considers experience in terms of the number of international one day matches in which the player was in the playing eleven. As noted by different stakeholders of the game that a thinking bowler can survive in Tewnty20 cricket, so it may be assumed that one who has bowled in different situations develops an enriched thought process. As bowling in different match situations increases the experience of bowler per match, so number of ODI matches played by the player is included in the initial model.

Twenty20 matches played: This is another variable measuring experience and is measured by the number of international Tewnty20 matches played by the player. It is the number of international Twenty-20 matches in which he was in the playing eleven. The reason of including this variable is same as that of the above.

Country : 'If you have to bowl on wickets like those in India, you have no choice but to make sure you do your best and hope that (the team) gets two wickets in the first 10 overs, so that the spinner can come and bowl [17]. As Indian wickets are batsman friendly and Indian bowlers have the experience of playing in Indian soil so it may be assumed that they shall perform better in Indian conditions. Thus, the country to which the player belongs needs to be included in the model. This variable used in this model is again considered as a binary categorical variable. The two categories are India (1) and others (0). As the entire tournament is played in the Indian soil so it may be believed that the Indian bowlers can utilize the Indian environment and shall take an upper hand compared to their overseas counterparts.

Combined Bowling Rate in One-day international matches: Some experts comment about the overall experience of the bowler. 'The old boys have been making a huge impact largely due to their skills, which have made them everyday cricketers, unlike the ones who fire once in a while' [13]. Thus, there should be a predictor that can consider the entire career's performance of the players. Accordingly, the career CBR for ODI's and Tewnty20 cricket is considered in the model. Since one-day matches are also limited over games so the performance of bowlers in this form of cricket is included in the model. This variable is of continuous form. For the players who have not played in any ODI, CBR for first class matches are calculated. Though domestic performance cannot replace the outcome of international performance yet it can provide an estimate in case of non-availability of data.

Combined Bowling Rate in Twenty20 international matches: Since performance of players in international matches is considered while the bidding is done so bowling performance at that level needs inclusion in the model. The combined bowling rate (CBR) of the players in international Tewnty20 matches is thus considered. This variable is of continuous form. However, there are some players who have not played in any international Twenty20 match and hence their CBR for international matches is not available. For such players the CBR for domestic Tewnty-20 matches is calculated and considered in the model.

4. Research Methodology

4.1. Multiple Regression Model

For calculating CBR, multiple regression model is used. It is utilized when a relationship is to be established between a dependent variable Y and its potential predictors (X_1, X_2, X_3…). In general, the response (dependent) variable may be related to the *k* regressors (or predictor) by the relation,

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + ... + \beta_k x_k + \varepsilon \quad (1)$$

Where,

β_0 = the constant of regression also called as intercept.

$\beta_1, \beta_2, \ldots, \beta_k$ = the partial regression coefficients associated with the k independent variables.

$\in$ = The residual of regression, which is the error term associated with the regression model.

In multiple regression a great deal of care should be taken in selecting predictors for a model because the values of the regression coefficients depend upon the variables in the model. In an ideal world, predictors should be selected based on past research [6].

Statistically the regression is possible as long as the number of observations (sample size) is more than

the number of predictors. But according to Evan's rule if *n* is the sample size and *k* is the number of predictors, then $(n/k) \geq 10$ i.e. at least 10 observations per predictor [5]. As a general rule, the fewer the predictors the better, and certainly include only those predictors for which you have a good theoretical grounding [6].

4.2. Selection of Players for the Model

To quantify the performance of players it is necessary that players' statistics for large number of games should be considered. The actual quality of a player may not be properly judged from one or two appearances. The effects of outstanding or poor, single performances are smoothed over the larger number of games [9]. The expectations regarding level of performance cannot be gauged fairly from only one match therefore individual performances across a series of matches are required to provide a suitable frame of reference. The nature of the professional sport ensures that the majority of individuals will experience sufficient match-play to enable this type of methodology to be deployed [1]. Thus, some selection criterion needs to be set up which will also help to identify the changes in performance of players. The players who had satisfied all the following conditions were spaced in the training sample.

- The bowler has played at least 5 matches in IPL IV.
- The bowler has bowled at least 100 balls in IPL IV.
- The bowler took at least 5 wickets in IPL IV.

4.3. Data Source

There were only 63 players who satisfied all the above criteria. The information about their performances in IPL, ODI and Twenty20 internationals etc are collected from the websites *iplt20.com, cricwaves.com* and *cricinfo.org.*

Following the Evan's rule on the sample size (Section 4.1) the number of predictors shall not be more than six in the multiple regression model. The correlations between the predictors are calculated. From the pair in which the correlation is significant only one of the variables is considered. From the left out predictors all different combinations are tried to get the best (maximum value of Adjusted R^2) and significant regression model (ANOVA) keeping in mind the Evan's rule. With the ultimate model the best predictors that have a significant role on the performance of bowlers can be identified. Also with the categorical variables (binary in nature) one can use the regression model to compare between the components. All necessary computation in this work is performed using PASW 18.0.

Table 1: Composition of the sample with type of bowlers cross classified by country

Parameter		**Country of the player**		Total
		India	**Others**	
Type of Bowler	**Spin**	9	14	23
	Fast	18	22	40
Total		27	36	63

5. Results and findings

From the above discussion as many as nine independent predictors were considered as the response variable Performance of bowlers in IPL IV measured by the combined bowling rate (CBR) in IPL IV. Considering Evan's rule the available sample size does not support more than six predictors. Running several possible regression models ultimately the regression equation with four predictors are considered they are Variation in ball speed (X_1), Number of ODI played (X_2), CBR T20 (X_3) and Type of Bowler (X_4) provides the best fit. The variance ratio of the regression equation to that of the residuals (F-value) is given by 3.394 with corresponding p-value 0.015 implying significance of the regression equation. The table below provides the necessary model summary.

Table 2. Model summery of the best fitted multiple regression models

Variables in the Model	Non- standardized Coefficients		Standardized Coefficients	t-value	p-value
	B	Std. Error	Beta		
(Constant)	11.174	1.553		7.194	.000
Variation in ball speed (X_1)	-.016	.009	-.226	-1.852	.069
Number of ODI played (X_2)	.010	.005	.262	2.095	.041
CBR T20 (X_3)	.227	.105	.257	2.161	.035
Type of Bowler (X_4)	1.134	.685	.204	1.656	.103
Dependent variable CBR in IPL IV					

5.1. Summary of regression model results

From the regression model we reach to the following conclusions:

(1) Variation in ball speed has a feeble significance in influencing the bowling performance (p-value being 0.069). The negative value of the coefficient (-0.016) implies that bowlers with more variation in ball speed has a lower value of CBR. As CBR is a negative measure so less the CBR better is the bowling performance. Thus, more variation in ball speed shall lead to a better bowling performance.

(2) Number of ODI's played by the bowler is significantly related to the bowling performance. As the regression coefficient is positive so it implies that with increasing number of matches played the CBR is showing an increase implying a poorer performance. This provides an indication that the more experienced bowlers are getting more predictable to the batsman.

(3) CBR in Tewnty20 is another variable which is significant and positively related with CBR in IPL IV. Thus a better performing bowler in Tewnty20 also performs well in IPL IV and vice-versa.

(4) Type of bowler does not have any significant impact in the performance of the bowler in IPL. Thus, statistically speaking there is no evidence that the spinners are performing better than the fast bowlers.

5.2. Variables not included directly in the model:

(1) Age: The variable is not included in the model as it has a highly significant correlation with the variable 'Number of ODIs Played' which is present in the model.

(2) Number of Tewnty20 played: This is another variable which is also not included in the model for having a highly significant correlation with the variable 'Number of ODIs Played' which is already included in the model.

(3) Combined Bowling Rate in ODI is also dropped for having highly significant correlation with the variable 'Combined Bowling Rate in Tewnty20', a variable that is also included in the model.

(4) Country: As there is no significant difference between the CBR of Indian and overseas player so this variables are dropped from the model.

(5) Ball speed: Though this variable was supposed to be an important predictor for the model but its inclusion made the regression insignificant and also increased the multi-colinearity between the variables.

6. Discussion and Further Area of Research

Some of the results obtained from the analysis differ from the opinion of the experts. For instance, the better performance of the spinners in IPL compared to fast bowlers, is not accepted by the empirical model. While the opinion of the experts is dominated by the star performers of the game, the empirical models give equal importance to all the participants and hence the results are true on an aggregate.

The study helps to identify the factors that are responsible for the performance of the bowlers in Twenty-20 cricket. The findings may be used by the selectors to choose the bowlers from a host of possible players for a given team. The franchisee of IPL teams may use this information and target players while bidding. Such studies can be extended to batsman as well as wicket keepers. However, it is difficult to attempt the same for the fielders as there is no proper measure for fielding performance.

Statistical calculations based on performance measurement and related studies are a fertile area for future research. The performance measurement technique of individual players may be combined to evaluate the performance of different possible combinations of a particular team. This may help the captain and the coach to select an optimal playing XI for any game. Each game of cricket, irrespective of its version, generates huge numerical values that can be utilized in decision making. This shall lead a way in which the benefit of statistical tools shall be enjoyed by the cricketing fraternity.

7. References

[1] P. J. Bracewell and K. Ruggiero. A parametric control chart for monitoring individual batting performances in cricket. *Journal of Quantitative Analysis in Sports.* 2009, **5**: 1-19.

[2] Chawla, P. *The charge of the spin brigade.* (V. Lokapally, Interviewer). Sportstar. 2010, **33**(16). Chennai.

[3] Chopra, A. Spin and the art of attack. Retrieved July 19, 2011, from ESPN Cricket Web site: *www.espncricinfo.com/magazine/content/story/510863.html*

[4] Dinakar, S. *Taking big strides.* Sportstar. 2009, **32** (18): 19.

[5] Doane D., and Seward L. *Applied Statistics in Business and Economics.* New Delhi: Tata-McGraw-Hill Publishing Company Limited, New Delhi, India. 2007.

[6] Field, A. *Discovering Statistics Using SPSS*. Edition 3. London: Sage Publications Limited. 2009, pp. 212.

[7] Kumble, A. *The charge of the spin brigade.* (V. Lokapally, Interviewer) Sportstar. Chennai. 2010, **33**(16)

[8] Lemmer, H. H. The combined bowling rate as a measure of bowling performance in cricket. *South African Journal for Research in Sport, Physical Education and Recreation.* 2002, **24** (2): 37-44.

[9] Lewis, A. J. Towards fairer measures of player performance in one-day cricket. *Journal of the Operational Research Society.*2005, **56**: 804-815.

[10] Mishra, A. *The charge of the spin brigade*. (V. Lokapally, Interviewer) Sportstar. Chennai. 2010, **33**(16).

[11] Parnell, W. *Only Thinkers Survive T20.* (A. Chakraborty, Interviewer) cricket.yahoo.com. 2011, April 21.

[12] Raman, W. V. *On restoring the balance between bat and ball.* (N. Ram, Ed.) Sportstar. 2008, **31**(27): 16.

[13] Raman, W. V. *There's no substitute for skill.* (N. Ram, Ed.) Sportstar. 2009, **31**(27): 24.

[14] Raman, W. V. *Spinners revel in IPL*. (N. Ram, Ed.) Sportstar. 2010, **33** (16): 13.

[15] Raman, W. V. *Will luck run CSK's way?* (N. Ram, Ed.) Sportstar. 2010, **33** (12): 23.

[16] Pahinkar D.G and J Srinivasan. Simulation of reverse swing of cricket ball. *International Journal of Sports Science and Engineering,* 2010, **4** (1): 053-064.

[17] Singh, H.. You play with the batsman's mind or you let him settle. (N. Gollapudi, Interviewer), *http://www.espncricinfo.com/magazine.* 2011, February 15.

[18] Singh, H. *The charge of the spin brigade.* (V. Lokapally, Interviewer) Sportstar. Chennai. 2010, **33**(16).

[19] Warne, S. *The charge of the spin brigade*. (V. Lokapally, Interviewer) Sportstar. Chennai. 2010, **33**(16).

8. Appendix

CBR of bowlers in IPL IV

Name of the bowler	Avg. speed	Variation in speed	Type of Bowler	Country	Age	ODI Played	T20 played	CBR ODI	CBR T20	CBR IPL4
S. Jakati	84.31	26.83	Spin	India	29	0	0	11.64	13.2	15.08
A. Morkel	132.03	46.41	Fast	Others	28	51	31	12.64	15.48	14.11
R. Ashwin	88.08	52.38	Spin	India	23	9	3	10.57	16.01	11.22
S. Raina	86.06	56.55	Spin	India	23	115	19	13.51	17.66	16.88
J. Botha	91.99	54.55	Spin	Others	27	74	26	11.49	11.6	14.13
Amit Singh	129.62	124.54	Fast	India	24	0	0	0	0	13.35
Siddharth Trivedi	123.7	62.44	Fast	India	27	0	0	11.01	13.79	15.37
Shane Warne	81.46	55.82	Spin	Others	40	194	0	9.94	13.37	12.09
Pragyan Ojha	89.65	22.62	Spin	India	23	16	6	10.37	9.54	13.4
Dale Steyn	137.6	101.47	Fast	Others	26	54	21	11.42	11.37	12.06

Name of the bowler	Avg. speed	Variation in speed	Type of Bowler	Country	Age	ODI Played	T20 played	CBR ODI	CBR T20	CBR IPL4
Ishant Sharma	135.16	84.61	Fast	India	21	45	11	12.63	17.87	13.84
Daniel Christian	127.06	88.38	Fast	Others	26	0	3	13.46	16.84	14.99
Amit Mishra	88.15	61.26	Spin	India	27	10	1	12.3	10.72	11.51
Denial Vettori	86.23	216.39	Spin	Others	31	272	28	10.12	9.92	11.69
Virat Kohli	100.4	16.86	Fast	India	21	54	3	6.17	20.78	19.2
Zaheer Khan	133.04	37.21	Fast	India	31	191	12	11.25	13.67	15
R P Singh	131.03	10.74	Fast	India	24	55	10	12.46	10.37	13.42
Srisanth	135.67	63.29	Fast	India	26	53	10	13.34	16.97	13.46
Rabinder Jadeja	92.42	101.87	Spin	India	21	35	9	12.1	16.47	15.33
Vinay Kumar	122.85	57.98	Fast	India	25	2	3	17.1	11.07	14.15
Pollard	121.8	40.23	Fast	Others	22	39	20	12.04	15.56	16.38
James Franklin	124.14	27.17	Fast	Others	29	89	16	12.5	13.06	16.62
Lashit Malinga	137.8	71.15	Fast	Others	26	84	29	11.07	12.38	9.47
Harbajan Singh	90.19	55.87	Spin	India	29	226	22	10.59	13.67	13.33
Munaf Patel	130.36	35.67	Fast	India	26	62	1	11.27	15.1	10.72
Irfan Pathan	123.12	60.65	Fast	India	25	107	16	11.85	13.51	14.79
Srikanth Wagh	132.95	15.44	Fast	India	21	0	0	12.38	14.21	14.49
WD Parnell	137.8	33.76	Fast	Others	20	19	11	12.86	12.08	13.07
Praveen Kumar	129.29	22.06	Fast	India	23	48	4	11.89	8.84	15.11
Pyush Chawla	90.11	30.59	Spin	India	21	25	3	12.04	13.71	12.82
Iqbal Abadulla	93.3	28.71	Spin	India	20	0	0	9.46	11.19	11.12
Lakshmipati Balaji	128.77	95.75	Fast	India	28	30	0	13.14	13.75	16.39
Y Pathan	89.6	39.8	Spin	India	27	51	19	12.92	15.48	10.94
Rajat Bhatia	102.3	50.42	Fast	India	30	0	0	11.85	13.08	12.92
Sreenath Aravind	130.39	47.71	Fast	India	25	0	0	9.58	11.56	11.62
Brat Lee	138.71	57.2	Fast	Others	33	201	19	10.34	14.46	18.04
Shane Watson	132.94	35.74	Fast	Others	28	133	22	11.17	11.17	14.84
RJ Harris	137.72	27.33	Fast	Others	30	17	3	9.27	13.51	13.54
Randiv	80.43	23	Spin	Others	24	22	6	10.8	11.33	15.67
Tim Southee	130.34	72.24	Fast	Others	21	51	19	14.2	11.9	17.28
Dilshan	80.59	19.19	Spin	Others	33	203	32	15.6	11.72	22.34
Dirk Nannes	132.98	39.18	Fast	Others	33	1	17	7.06	11.07	10.83
Murlidharan	81.89	29.53	Spin	Others	37	350	12	9.2	12.07	18.47
Gomez	110.6	60.55	Fast	India	25	0	0	15.09	17.05	13.84
Ali Murtaza	86.93	33.7	Spin	India	20	0	0	9.15	12.63	13.54
van der Marway	90.06	48.71	Spin	Others	25	13	13	11.36	12.33	11.42
M Morkel	140.24	26.35	Fast	Others	25	44	17	10.7	10.37	13.47
Ashoke Dindha	132.73	26.72	Fast	India	25	5	3	15.58	10.69	15.48
Alfanso Thommas	134.29	29.36	Fast	Others	32	0	1	11.37	7.41	14.07
Ryan McLaren	133.26	64.8	Fast	Others	26	10	5	12.65	10.87	17.09
Avisekh Nayyar	118.48	42.29	Fast	India	26	3	0	5.66	16.78	18.86
Jaidev Unadkat	121.98	103.06	Fast	India	18	0	0	10.51	10.93	13.99
Shahbaz Nadeem	85.28	32.21	Spin	India	21	0	0	9.33	11.87	15.22

Name of the bowler	Avg. speed	Variation in speed	Type of Bowler	Country	Age	ODI Played	T20 played	CBR ODI	CBR T20	CBR IPL4
Brad Hodge	84.76	5.21	Spin	Others	35	25	8	11.96	10	8.83
Manpreet Gony	130.3	156.43	Fast	India	26	2	0	13.44	13.81	15.22
Shaun Tait	150.9	6.49	Fast	Others	26	35	19	11.03	11.29	13.34
Johan VD Wath	133.69	18.91	Fast	Others	32	10	8	14.45	14.15	18.99
NLTC Parera	133	5.11	Fast	Others	20	20	7	10.91	11.33	17.86
Romesh Power	82.57	0.74	Spin	India	31	31	0	11.29	15.4	19.63
Ryan Ninan	81.03	5.27	Spin	India	25	0	0	11.17	13.52	13.52
Paul Valthaty	107.81	28.44	Fast	India	26	0	0	0	14.52	14.14
JP Dumini	89.33	31.52	Spin	Others	25	78	30	12.21	12.88	15.71
Abhimunya Mithun	135.53	21.55	Fast	India	20	2	0	12.57	18.93	20.55