

# Investigating Report Cards to Predict the Academic Performance of New MBA Students

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## Abstract

Report cards not only attest to students' academic performance in a program, but they also contain several valuable insights. The study was based on the analysis of information readily available on the report cards of MBA 1st semester students. Report cards of 1,301 students enrolled in Dr. APJ Abdul Kalam Technical University, India (Asia's largest affiliating University) affiliated institutions were examined. The study identified two types of courses: quantitative courses and non-quantitative courses. Furthermore, students' performance varied significantly between categories, and quantitative courses were more difficult to score than non-quantitative courses. Decision models capable of predicting 'overall academic performance' were developed using multiple linear regression analysis. Report cards were used to collect data on the dependent variable (overall academic performance) and five predictor variables (gender, ethnicity, and students' performance in three quantitative courses, namely managerial economics, business statistics, and business accounting). Finally, the study discovered that the predictor variable 'AGP in Managerial Economics' had the most significant impact on overall academic performance. Then came 'AGP in Business Statistics,' 'AGP in Business Accounting,' and the gender of the students.

**Keywords :** academic performance, quantitative courses, gender, ethnicity, AGP (average grade points), SGPA (semester grade point average)

**JEL Classification Codes :** I20, I23, M00, M10

**Paper Submission Date :** June 15, 2021 ; **Paper sent back for Revision :** January 18, 2022 ; **Paper Acceptance Date :** February 20, 2022 ; **Paper Published Online :** March 15, 2022

For people worldwide, management education is a highly sought-after field of study. Most of the world's best minds pursue management education because it is a surefire way to high-paying jobs with promising futures (Harsolekar & Munshi, 2018). The academic success of students in higher education can be shaped by a combination of complex forces (Duggal & Mehta, 2015; Nema & Kasliwal, 2018; Phang et al., 2014), such as ethnicity (Rienties et al., 2012), class attendance (Broker et al., 2014), sex (Hettler, 2015), personality (Russo & Kaynama, 2012), mode of delivery (Simmons, 2014), family background (Duggal & Mehta, 2015), faculty behaviors and attitude (Prathiba, 2020), score in the previous program (Christensen et al., 2012), entrance exam (Kass et al., 2012), study duration (Katsikas & Panagiotidis, 2010), etc. Few of these factors can be studied thoroughly by analyzing report cards and other available documents. The report card is a testimony of the student's

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**DOI :** <https://doi.org/10.17010/pijom/2022/v15i3/168846>

performance in various management program courses. It indicates their interest and proficiency in a particular course and their ability and willingness to perform a specific type of job or function (Mishra, 2018).

Pressure to perform better in academics has been identified as a significant factor causing stress among students at various levels of management and other professional education (Preet & Ahluwalia, 2019). Scholars worldwide have recognized students' grade point average (GPA) as a strong indicator of their performance in the program (Guidry, 2013; Mishra, 2018) and a determinant of their future success. Various courses in management programs require students to demonstrate their quantitative and non-quantitative skills in varied proportions. Researchers across the world have emphasized that students' quantitative or mathematical competency determine their performance in many courses (Cordis & Pierce, 2017; Gupta & Maksy, 2014; Gougeon, 2016), such as business statistics, economics, finance and accounting, investment, decision sciences, information technology, etc. At the same time, their proficiency in non-quantitative or qualitative skills determines their performance in other courses (Cordis & Pierce, 2017; Nalukenge et al., 2016) such as marketing management, communication, management principles, project management, law, business ethics, etc.

✍ **Problem Statement.** Can readily available general information on report cards and scores in quantitative courses be used to investigate and predict new MBA students' overall academic performance?

## Literature Review

Traditionally, the MBA program taught a wide range of courses that might be categorized under two categories: qualitative courses and quantitative courses (Cordis & Pierce, 2017; Guidry, 2013). Quantitative courses were numerically based and required mathematical skills; whereas, qualitative courses or non-quantitative courses were conceptual courses and did not require skills in mathematics (Guidry, 2013).

### Quantitative Courses

Scholars found a strong relationship between management students' quantitative and analytical skills and their performances in courses such as statistics (Gougeon, 2016), microeconomics (Arnold & Straten, 2012), finance (Cordis & Pierce, 2017), investment (Gupta & Maksy, 2014), accounting (Cordis & Pierce, 2017; Ujar & Güngörmüş, 2011), operation research and decision sciences (Yousef, 2012), information systems (Schlee & Harich, 2014), etc. In addition, Opstad (2018) used quantitative analysis to determine whether the type of quantitative and mathematics skills affected students' success in business management programs in Norway.

It was found that students with higher quantitative skills achieved higher grades in most of the core business management courses, such as business mathematics and business statistics, business economics, financial analysis and investment, and microeconomics. Kohli et al. (2011) assessed the determinants of students' success in the business statistics course at a state university in Northeast India. They concluded that robust mathematics is vital for students' success in the business statistics course and the other business major courses. Student attitudes were necessary for statistics because the course content tended to be challenging. Students with positive attitudes were more likely to effectively utilize statistics beyond their classroom (Chan & Ismail, 2014). Singh et al. (2017) investigated Indian MBA students' motivation towards learning quantitative courses. They held many quantitative courses in the curriculum (such as business statistics, decision sciences, and research methods). Students must achieve a minimum grade in all the courses, including quantitative ones. Their study further identified factors contributing to the learning of quantitative courses in India.

Quantitative and analytical skills are also essential in investment courses (Gupta & Maksy, 2014). Students with good mathematics ability performed better in investment courses. Students with a strong mathematics

background outperformed those with weaker mathematical backgrounds in quantitative financial management courses (Cordis & Pierce, 2017). Ujar and Güngörmus (2011) observed that students' mathematical and quantitative skills were positively correlated with their performance in accounting. On the other hand, many scholars failed to find evidence of such a relationship (Guney, 2009). Studies found a link between the quantitative abilities of the students and their performance in the financial accounting course. However, no such relationship was found for the cost accounting course. Rahal and Zainuba (2016) conducted a longitudinal study to investigate the poor performance in quantitative courses and enhance it among business management students. Scholars developed a decision model to predict final grades and the likelihood of success of pedagogical innovations. Irfan et al. (2012) studied Pakistani management students and found a higher failure rate in quantitative courses than non-quantitative courses.

### ***Non-Quantitative Courses***

There are many courses in management programs where students' performance is not positively and strongly influenced by their quantitative and analytical skills (Cordis & Pierce, 2017; Opstad, 2018). Instead, the students' performance in such courses is hugely affected by their non-quantitative skills, such as communication and presentation skills, critical thinking and problem-solving skills, reasoning and logic, teamwork, reading comprehension, etc. Students' proficiency in non-quantitative skills positively influenced their performance in courses such as marketing (Cordis & Pierce, 2017), communication (Yousef, 2012), management principles and practices (Cordis & Pierce, 2017), and project management and law (Nalukenge et al., 2016).

According to Baird and Munir (2015), to meet the demands of the changing economic environment, new types of accounting professionals equipped with skills such as communication, teamwork, leadership, and interpersonal skills are required. Accounting bodies worldwide expect soft skills to be grounded in the accounting curriculum subjects offered by tertiary institutions. Business students' English language and communication skills influence their academic performance. Several studies found that proficiency in the English language influenced students' academic performance (Yousef, 2012). English language and communication influenced the academic performance of undergraduate business students in introductory quantitative courses (Yousef, 2012). Previous studies (Nalukenge et al., 2016) argued that English skills are essential indicators of the academic performance of international students in project management courses. Superior English proficiency is the most crucial factor that affects students' performance in business management programs. Nalukenge et al. (2016) studied the proficiencies and skills required by post-graduate students at Makerere University (Uganda). They concluded that proficiencies in non-quantitative skills determined students' success in the Law program. However, quantitative skills were not as crucial in ensuring superior grades in non-quantitative courses as in quantitative business courses. However, it is still a vital predictor in many non-quantitative courses, especially in the business law course (Opstad, 2018).

Cordis and Pierce (2017) conducted a study on the academic performance of college students. They found that some courses, such as accounting, finance, economics, and quantitative methods, required higher quantitative problem-solving skills than other courses, such as marketing management and general business administration. Guidry (2013) examined students' success determinants in quantitative and qualitative courses. The author found that students' skills in mathematics and their semester GPA determined their success in quantitative courses. At the same time, students' reading comprehension skills decided their success in non-quantitative courses.

### ***Gender and Ethnicity***

Scholarly contributions showed contrary results regarding the role of students' gender on their academic

performance (Fallan & Opstad, 2014). Several studies on business students found no gender predictability for academic performance (Fallan & Opstad 2014 ; Rudranath, 2013). Fogarty and Gouldwater (2010) found that though females scored more marks than males, the difference in marks was not significant. Hettler (2015) also failed to find any statistically significant difference between the academic performances of MBA students of opposite genders.

Numerous studies, on the other hand (Rath & Kar, 2012; Russo & Kaynama, 2012), discovered a significant relationship between students' gender and their academic performance. These studies found that the academic performance of university students may vary with their gender. And in many cases, students' gender may also be used to predict their academic performance. Several researchers (Epstein et al., 2013; Rath & Kar 2012) discovered that females frequently outperformed their male counterparts. Rath and Kar (2012) concluded that female MBA students in India scored significantly greater in university examinations. Russo and Kaynama (2012) examined the relationship between gender and students' grade and found a significant association between them.

Several researchers (De Jager & Bitzer, 2013; Hettler, 2015; Kumar et al., 2019; Rienties et al., 2012) studied the nature of the relationship between the ethnicity of students and their academic performance in business schools. Most of them (De Jager & Bitzer, 2013; Kumar et al., 2019; Rienties et al., 2012) found an influence of ethnicity on MBA students' academic performance. Rienties et al. (2012) investigated the performance of domestic and foreign MBA students in the Netherlands. They finally concluded that the academic performance of the Western students was significantly better than the performances of mixed-western, non-western, and Dutch students. Later, De Jager and Bitzer (2013) observed that students' academic performance at Stellenbosch University differed with their skin tone and tongue. Contrary to previous studies, Hettler (2015) found an insignificant difference in the academic performance of white-tone MBA students compared with Afro-American students in the quantitative methods course.

Kumar et al. (2019) conducted a study to compare the employability skills of Scheduled Caste (SC) and Scheduled Tribes (ST) MBA students with other MBA students in Andhra Pradesh (India). SC/ST management graduates were significantly behind their peers in quantitative and non-quantitative skills, including analytical ability, technical skills, communication skills, leadership, higher-order thinking, planning, and time management. The study further proposed that the government offer SC/ST students training and regularly monitor their activities, progress, and budget spending.

## Research Gap and Research Questions

The literature review in the previous section is instrumental in identifying the research gap and research questions for the study. Several studies have found that strong mathematical and analytical skills correlate with higher performance in quantitative courses. At the same time, many other scholars found evidence of proficiency in generic skills and superior performance in non-quantitative courses. However, very few previous studies specifically identified quantitative and non-quantitative courses in the MBA curriculum (Cordis & Pierce, 2017). Since most previous studies used the survey method (Kohli et al., 2011; Opstad, 2018; Yousef, 2012) to obtain students' performance, they were prone to several limitations of questionnaire studies. There are very few previous studies (Mishra, 2018) that analyzed the report cards of new MBA students. Existing literature further lacked studies measuring the difference in students' performance between quantitative and non-quantitative courses.

✎ **Research Question.** Is new MBA students' academic performance different in quantitative and non-quantitative courses?

### ***Null and Alternative Hypotheses***

↪  $H_{o1}$  : There is no significant difference in the academic performance of new MBA students in quantitative and non-quantitative courses.

↪  $H_{a1}$  : There is a significant difference in the academic performance of new MBA students in quantitative and non-quantitative courses.

Several studies have produced contradictory findings regarding the role of gender in academic performance. Some studies found no association between management students' gender and academic performance. At the same time, other studies found a significant association between gender and students' academic performance. Many researchers investigated the relationship between ethnicity and students' academic performance.

↪ **Research Question.** What is the influence of gender, ethnicity, and students' performance in quantitative courses on 'the overall academic performance in terms of semester grade point average, i.e., SGPA' of new MBA students?

### ***Null and Alternative Hypotheses***

↪  $H_{o2}$  : There is no significant relationship between gender and the overall academic performance of new MBA students.

↪  $H_{a2}$  : There is a significant relationship between gender and the overall academic performance of new MBA students.

↪  $H_{o3}$  : There is no significant relationship between ethnicity and the overall academic performance of new MBA students.

↪  $H_{a3}$  : There is a significant relationship between ethnicity and the overall academic performance of new MBA students.

↪  $H_{o4}$  : There is no significant relationship between students' performance in a quantitative course (managerial economics) and their overall academic performance.

↪  $H_{a4}$  : There is a significant relationship between students' performance in a quantitative course (managerial economics) and their overall academic performance.

↪  $H_{o5}$  : There is no significant relationship between students' performance in a quantitative course (business statistics) and their overall academic performance.

↪  $H_{a5}$  : There is a significant relationship between students' performance in a quantitative course (business statistics) and their overall academic performance.

↪  $H_{o6}$  : There is no significant relationship between students' performance in a quantitative course (business accounting) and their overall academic performance.

↪  $H_{a6}$  : There is a significant relationship between students' performance in a quantitative course (business accounting) and their overall academic performance.

Documentary evidence for assessing and predicting students' performance in many business disciplines is available using OLS (D'Souza & Maheshwari, 2011) and regression (Estelami, 2014; Rahal & Zainuba, 2016).

Previous studies predicted students' performance in specific subjects such as accounting. The available pool of literature is deficient in terms of research studies attempting to predict students' overall academic performance in terms of SGPA.

➤ **Research Question.** How well can the information obtained from new MBA students' report cards predict overall academic performance in terms of SGPA?

## Research Methodology

The study's main aim is to analyze the information readily available on the report cards of new MBA students and to further predict their overall academic performance in terms of their Semester Grade Point Average (SGPA). The study is quantitative. It used a cross-sectional descriptive research design and a judgmental sampling technique. A group of senior academicians was consulted for advice on sampling-related matters. Based on their suggestions, the research analyzed the report cards of MBA students enrolled in academic institutions affiliated with Dr. APJ Abdul Kalam Technical University (AKTU) and situated in Knowledge Park, Greater Noida, Uttar Pradesh (India). Between November 2019 and December 2020, the study underwent thorough conceptualization, research problem and gap identification, development and hypothesis testing, and data analysis.

### Sampling and Data Collection

The sample included only MBA I<sup>st</sup> semester students enrolled in AKTU affiliated general MBA program. It excluded other post-graduate management programs such as the MBA (tourism and hospitality). Furthermore, the study also excluded institutions with no new enrollments. A month after the announcement of MBA I<sup>st</sup> semester results, 1,164 report cards of new MBA students studying in 29 different AKTU affiliated academic institutes in Knowledge Park were downloaded from the AKTU'S official website. Based on the advice of experts, the study further excluded students with partially declared results or who were absent in one or few course examinations. The literature review identified several possible predictors of the academic performance of new MBA students. The students' report cards traced gender, ethnicity, and marks/grades in various curriculum courses.

**Table 1. Descriptive Statistics for the Sample (N = 1,301)**

| Binary Variables/Categorical Variables |               |        |
|----------------------------------------|---------------|--------|
| Name                                   | Count         | Total  |
| Male                                   | 951 (73.1%)   | 1,301  |
| Female                                 | 350 (26.9%)   | (100%) |
| Indian Religions                       | 1,134 (87.2%) | 1,301  |
| Foreign Religions                      | 167 (12.8%)   | (100%) |
| Continuous Variables                   |               |        |
| Name                                   | Mean          | S.D    |
| Semester Grade Point Average (SGPA)    | 3.05          | 1.88   |
| AGP in Managerial Economics            | 2.56          | 2.71   |
| AGP in Business Accounting             | 1.46          | 2.43   |
| AGP in Business Statistics             | 2.70          | 3.19   |

Source : Report card of students.

Appropriate grades represented marks obtained in a specific course. Furthermore, average grade points (AGP) and semester grade points average (SGPA) were calculated using AKTU's prescribed conversion rule. Other than the marks obtained by students in various external examinations for multiple courses, the report cards also carried indicators of their gender and religion. An Indian's full name is often a clear indicator of his/her gender and religion. The report cards also had the full name of the student's father, which was used to confirm the student's religion. Hence, students' gender and ethnicity were determined by observing students' and their fathers' full names on their report cards (refer to Table 1).

### **Data Analysis**

For detailed statistical analysis, SPSS 20.0 was used. To reveal the natural characteristics of the data, descriptive statistics such as percentages, averages, and variance were primarily calculated.

### **Paired Sample *t*-test and Multiple Regression Analysis**

The hypothesis of interest was tested using two-tailed paired sample *t*-tests to large samples at a 95% confidence level. A paired-samples *t*-test determines the significance of the difference in the student's performance in the quantitative courses versus the same student's performance in non-quantitative courses. In the conceptual model, the overall performance (SGPA) of new MBA students was identified as a function of the student's gender, ethnicity (based on the origin of religion), and average grade points (AGP) earned in three quantitative courses, namely, managerial economics, business accounting, and business statistics. A linear multiple regression model is designed for the study at hand, assuming that five independent variables are potentially related to a single dependent variable.

$$SGPA = f(\text{Gender, Ethnicity, AGP in Managerial Economics, AGP in Business Accounting, AGP in Business Statistics}) \dots\dots (1)$$

The study uses a “dummy variable multiple regression analysis” as the model includes five independent variables or predictors (binary and continuous), namely gender, ethnicity, and grade points in three quantitative courses, namely, managerial economics, business accounting, and business statistics, for the prediction of a single dependent variable (continuous), namely SGPA.

Since “gender” and “ethnicity” both have two categories, only one dummy variable in each regression analysis is used. The study in hand accepted the “Gender\_Female” and “Ethnicity\_Indian origin” categories and omitted the “Gender\_Male” and “Ethnicity\_Foreign origin” categories.

### **Assessing the Model's Fit**

SPSS 20.0 assessed the model fit for the proposed regression model. It is essential to determine how well the linear model fits our data. If the data conforming to the linear model is not good, the researchers should discard the model and look for another model for the prediction. The study assesses the fitness of the above linear models by examining the standard error of estimate (SEE), *t*-test of the slope, coefficient of determination, and *F*-test of the analysis of variance.

## **Analysis and Results**

Students obtained the highest average grade points in the communication for management (AGP = 3.95) course,

making it the easiest course of the program. At the same time, students obtained the lowest average grade points in the business accounting (AGP = 1.46) course, making it the most challenging course of the MBA program (Table 2).

Based on the literature review in the previous section, two categories of courses were identified, viz. quantitative courses and non-quantitative courses (Cordis & Pierce, 2017; Guidry, 2013). Quantitative courses, namely, managerial economics, business accounting, and business statistics (Cronbach's alpha = 0.711), required students to demonstrate a sufficient amount of quantitative and mathematical skills (Cordis & Pierce, 2017; Gupta & Maksy, 2014). On the other hand, non-quantitative courses, namely, managing organization, business environment, marketing management, communication for management, and fundamentals of computer & information systems (Cronbach's alpha = 0.738), required students to demonstrate a sufficient amount of writing and presentation skills, reading comprehension, problem-solving skills, reasoning, logic, and teamwork (Cordis & Pierce, 2017; Nalukenge et al., 2016).

New MBA students obtained higher AGP (Table 3) in non-quantitative courses (3.59) than quantitative courses (2.51). Further, paired sample correlation indicates a strong and significant positive correlation ( $r = 0.67, p < 0.05$ ) between the students' performance in quantitative and non-quantitative courses.

The paired-samples *t*-test rejects the null hypothesis  $H_{01}$  ( $t = -23.19, p < 0.05$ ). It is now reasonable to say that new MBA students' performances have changed drastically in two categories of courses: quantitative and non-quantitative courses. Students scored significantly higher AGP in non-quantitative courses (3.59) than

**Table 2. Average Grade Points in Quantitative and Non-Quantitative Courses (N = 1,301)**

| Category                                              | Course Name and Code                          | Average Grade Points (AGP) |                |      |                | Semester Grade Point Average (SGPA) |                |
|-------------------------------------------------------|-----------------------------------------------|----------------------------|----------------|------|----------------|-------------------------------------|----------------|
|                                                       |                                               | Mean                       | Std. Deviation | Mean | Std. Deviation | Mean                                | Std. Deviation |
| Quantitative Courses<br>(Cronbach's alpha = .711)     | Business Accounting                           | 1.46                       | 2.71           | 2.51 | 2.12           | 3.05                                | 1.88           |
|                                                       | Managerial Economics                          | 2.56                       | 2.42           |      |                |                                     |                |
|                                                       | Business Statistics                           | 2.70                       | 3.18           |      |                |                                     |                |
|                                                       | Managing Organization                         | 2.90                       | 2.96           | 3.59 | 1.99           |                                     |                |
| Non-Quantitative Courses<br>(Cronbach's alpha = .738) | Fundamentals of Computer & Information System | 3.32                       | 2.77           |      |                |                                     |                |
|                                                       | Marketing Management                          | 3.69                       | 2.89           |      |                |                                     |                |
|                                                       | Business Environment                          | 3.82                       | 2.78           |      |                |                                     |                |
|                                                       | Communication for Management                  | 3.95                       | 2.57           |      |                |                                     |                |

**Table 3. Paired Sample Statistics and Paired Sample *t* - test**

|                          | Paired Samples Statistics |                |                    | Paired Samples Test |                |                 |             |                            | $H_0$    |
|--------------------------|---------------------------|----------------|--------------------|---------------------|----------------|-----------------|-------------|----------------------------|----------|
|                          | Mean                      | Std. Deviation | Correlation (Sig.) | Mean                | Std. Deviation | Std. Error Mean | <i>d.f.</i> | <i>t</i> & Sig. (2-tailed) |          |
| Quantitative Courses     | 2.51                      | 2.12           | .67<br>(.000)      | -1.08               | 1.68           | .05             | 1300        | -23.19<br>(.000)           | Rejected |
| Non-Quantitative Courses | 3.59                      | 1.99           |                    |                     |                |                 |             |                            |          |

quantitative courses (2.51). Hence, it may be concluded that quantitative courses are more difficult to score marks in than non-quantitative courses. This finding is similar to many studies on Asian students, such as Irfan et al. (2012) in Pakistan and Mishra (2018) in India.

### ***Assessing the Model's Fit***

Variables were entered into the regression using the forward method of selection. It suggested four decision models for predicting the dependent variable, namely 'academic success of new MBA students in terms of SGPA' (Table 4). The smaller values of the standard error of the estimate for all the four models (1.304, 1.035, .917, and .911, respectively) compared to the sample mean (3.05) of the dependent variable indicate an excellent fit for all proposed linear regression models.

### ***Multiple Correlations $R$ and Coefficient of Determination $R^2$***

At the same time, a high value of multiple correlations ( $R$ ) and coefficient of determination ( $R^2$ ) for all the four decision models (Model I:  $R = 0.721$  &  $R^2 = 0.519$ ; Model II:  $R = 0.835$  &  $R^2 = 0.697$ ; Model III:  $R = 0.873$  &  $R^2 = 0.763$ ; Model IV:  $R = 0.875$  &  $R^2 = 0.766$ ) indicate a significantly high correlation of independent variables in the respective models with the dependent variable 'academic success of new MBA students' in terms of SGPA (Table 4). A high value of coefficient of determination  $R^2$  indicates a high amount of explained variance (Model I: 51.9%; Model II: 69.7%; Model III: 76.3%; and Model IV: 76.6%) in the dependent variable across the four decision models.

**Table 4. Model Summary & ANOVA (Dependent Variable : SGPA)**

| Decision Model | Predictor Variables<br>(Entered via Forward Method; Criterion: Probability-of-F-to-enter < = .050)               | Model Summary |       |                |                            | ANOVA    |       |
|----------------|------------------------------------------------------------------------------------------------------------------|---------------|-------|----------------|----------------------------|----------|-------|
|                |                                                                                                                  | $R$           | $R^2$ | Adjusted $R^2$ | Std. Error of the Estimate | $F$      | Sig.  |
| I              | (Constant),<br>AGP in Managerial Economics                                                                       | .721          | .519  | .519           | 1.30414                    | 1403.360 | .000* |
| II             | (Constant),<br>AGP in Managerial Economics,<br>AGP in Business Statistics                                        | .835          | .697  | .697           | 1.03531                    | 1494.963 | .000* |
| III            | (Constant),<br>AGP in Managerial Economics,<br>AGP in Business Statistics,<br>AGP in Business Accounting         | .873          | .763  | .762           | .91720                     | 1388.775 | .000* |
| IV             | (Constant),<br>AGP in Managerial Economics,<br>AGP in Business Statistics,<br>AGP in Business Accounting, Gender | .875          | .766  | .765           | .91188                     | 1057.837 | .000* |

**Note.** \* Indicates significant.

$F$  - ratio in ANOVA tests whether the overall regression model is a good fit for the data (Table 4). A significant  $F$  - value (Model I:  $F = 1403.360$ ;  $p < .05$ ; Model II:  $F = 1494.963$ ;  $p < .05$ ; Model III:  $F = 1388.775$ ;  $p < .05$ ; Model IV:  $F = 1057.837$ ;  $p < .05$ ) leads to conclude that independent variables in the four proposed models can significantly predict the dependent variable 'academic performance of new MBA students.' In simple words, an accurate prediction about the dependent variable 'academic performance of new MBA students' can be made if we know nothing more about a new MBA student than his/her gender and average grade points in quantitative courses, namely managerial economics, business statistics, and business accounting. Regression models using the forward entry method excluded the independent variable: ethnicity.

#### Model I :

$$SGPA = 1.774 + .500 (AGP \text{ in Managerial Economics}) \quad \dots (2)$$

#### Model II :

$$SGPA = 1.419 + .340 (AGP \text{ in Managerial Economics}) + .284 (AGP \text{ in Business Statistics}) \quad \dots (3)$$

#### Model III :

$$SGPA = 1.380 + .284 (AGP \text{ in Managerial Economics}) + .225 (AGP \text{ in Business Statistics}) + .231 (AGP \text{ in Business Accounting}) \quad \dots (4)$$

#### Model IV :

$$SGPA = 1.344 + .279 (AGP \text{ in Managerial Economics}) + .224 (AGP \text{ in Business Statistics}) + .222 (AGP \text{ in Business Accounting}) + .241 (Gender) \quad \dots (5)$$

Among the four decision models, Model IV is the most robust model for predicting the overall academic performance of new MBA students in terms of SGPA as it has the highest multiple correlation ( $R = 0.875$ ) and coefficient of determination ( $R^2 = 0.766$ ). It explains a total of 76.6% of the variance (highest among all models) in SGPA. Table 5's standardized coefficient beta value indicates the relative influence of the entered variables on the dependent variable SGPA. AGP earned by new MBA students in the managerial economics course has the most substantial impact on their SGPA (beta = .402). It is followed by AGP made in the business statistics (beta = .381) course, business accounting (beta = .286) course, and gender (beta = .057), respectively. It may now be concluded that AGP in the managerial economics course has the maximum influence on the academic success of new MBA students. AGP in the business statistics course, business accounting course, and student gender are the second, third, and fourth strongest predictors of academic success.

Along with regression coefficients ( $R$ ) for each of the four decision models, Table 5 also contains the  $t$  - value and significance of each variable in the respective models. In all models, the  $t$ -value and its significance ( $p < .05$ ) satisfy the condition of a linear relationship, and hence, provide statistical evidence for a significant and positive relationship between 'gender' and 'overall academic performance' ( $H_{02}$ ) and students' 'academic performance in three quantitative courses' and their 'overall academic performance' ( $H_{04}$ ,  $H_{05}$ ,  $H_{06}$ ). It may now be concluded that those who obtained higher grade points in quantitative courses (namely managerial economics, business accounting, and business statistics in AKTU) tended to gain a higher SGPA in the first semester of AKTU's MBA program. This finding is in line with the results obtained by some previous researchers, namely, Kohli et al. (2011), Arnold and Straten (2012), Gougeon (2016), Cordis and Pierce (2017), and Opstad (2018). At the same time, the dummy independent variable, gender, has a significant positive association with overall academic

**Table 5. Regression Coefficients (Dependent Variable : SGPA)**

| Coefficients (Dependent Variable : SGPA) |                             |                             |            |                           |           |       |
|------------------------------------------|-----------------------------|-----------------------------|------------|---------------------------|-----------|-------|
| Decision Model                           |                             | Unstandardized Coefficients |            | Standardized Coefficients | t - value | Sig.  |
|                                          |                             | B                           | Std. Error | Beta                      |           |       |
| I                                        | (Constant)                  | 1.774                       | .050       | –                         | 35.644    | .000* |
|                                          | AGP in Managerial Economics | .500                        | .013       | .721                      | 37.461    | .000* |
| II                                       | (Constant)                  | 1.419                       | .042       | –                         | 34.164    | .000* |
|                                          | AGP in Managerial Economics | .340                        | .012       | .489                      | 28.073    | .000* |
|                                          | AGP in Business Statistics  | .284                        | .010       | .481                      | 27.625    | .000* |
| III                                      | (Constant)                  | 1.380                       | .037       | –                         | 37.446    | .000* |
|                                          | AGP in Managerial Economics | .284                        | .011       | .409                      | 25.523    | .000* |
|                                          | AGP in Business Statistics  | .225                        | .010       | .382                      | 23.473    | .000* |
|                                          | AGP in Business Accounting  | .231                        | .012       | .299                      | 18.889    | .000* |
| IV                                       | (Constant)                  | 1.344                       | .038       | –                         | 35.614    | .000* |
|                                          | AGP in Managerial Economics | .279                        | .011       | .402                      | 25.140    | .000* |
|                                          | AGP in Business Statistics  | .224                        | .010       | .381                      | 23.487    | .000* |
|                                          | AGP in Business Accounting  | .222                        | .012       | .286                      | 17.861    | .000* |
|                                          | Gender                      | .241                        | .060       | .057                      | 4.025     | .000* |

**Note.** \* Indicates significant.

performance (similar to Mishra, 2018). The forward method of variable selection excluded 'ethnicity' ( $H_{03}$ ) from the regression models as it violated the condition of linear relationship with the dependent variable SGPA.

## Conclusion

The study investigates the information readily available on the report cards of new MBA students enrolled in Dr. APJ Abdul Kalam University affiliated institutions in India and develops regression models capable of predicting academic performance in terms of SGPA. Firstly, the study identifies two categories of courses containing eight MBA Ist semester courses, that is, quantitative courses (managerial economics, business accounting, and business statistics) and non-quantitative courses (managing organization, business environment, marketing management, communication for management, and fundamentals of computer & information system). Further, the study concludes that students' performance hugely changed between quantitative and non-quantitative courses. Quantitative courses were difficult to score marks in as compared to non-quantitative courses. Further, multiple linear regression analysis using the forward entry method develops four decision models to predict the academic performance of new MBA students. The forward entry method removes the predictor variable 'ethnicity' and concludes that 'ethnicity' in terms of the origin of religion can't predict the academic performance of new MBA students.

Among the four decision models, Model IV is the most robust model for predicting new MBA students' academic performance with the highest multiple correlation ( $R = 0.875$ ) and explains maximum variance (76.6%) in SGPA. The study further finds that among the three quantitative courses, students' performance in managerial economics has the maximum influence on their overall academic performance in terms of SGPA. It is followed by

students' performance in the business statistics and business accounting courses. The gender of the students has the most minor influence on their SGPA.

## **Managerial and Theoretical Implications**

The study's findings have implications for stakeholders in management education in India, particularly government authorities (ministries, boards, etc.) and institutions, private academic institutions and administrators, job providers, teachers, and students and their parents. The study identifies non-quantitative and quantitative courses in the MBA curriculum. It further identifies courses that are easy or difficult to pass for students. It may help academic administrators identify their priorities and focus on areas of concern. It may further help the institutions' training and placement cells to identify students' fields of interest and nurture necessary skills to prepare them for suitable jobs in the future. The study determines 'overall academic performance' and identifies variables significantly contributing to it. It may help decision-makers identify variables strongly or weakly affecting academic performance and frame suitable education policies. The study also investigates the role and strength of quantitative courses in the overall academic performance of MBA students. Such information may be critical to educational planning, curriculum design, class management, and placement.

The study mainly contributes to the existing body of knowledge by developing a regression model to predict the overall performance of students based on their gender and performance in quantitative courses. The study establishes that report cards are not merely testimonial documents; they can be thoroughly analyzed to obtain vital insights. Very few scholars analyzed the report cards for predictions of students' performance. The study has excellent theoretical implications as there is insufficient literature on the difference in students' performance between quantitative and non-quantitative courses. In light of previous studies, the study identifies quantitative and non-quantitative courses in the MBA curriculum. This may help future researchers explore new dimensions in their field of study.

## **Limitations of the Study and Scope for Future Research**

The study sample is restricted to only AKTU affiliated private institutions in Knowledge Park, Greater Noida. Future researchers can include government institutes situated in other locations. The study relied entirely on the students' report cards, which provided only limited helpful information. However, the personal interviews can further collect additional information on other predictor variables (ex: qualification and occupation of parents, private tuition and coaching, peer pressure, etc.). For better prediction of overall academic performance, other variables could also be used in the regression model. The research findings cannot be generalized globally due to unique characteristics of countries and societies, different priorities, academic models, policy frameworks, etc.

## **Authors' Contribution**

Dr. Amitabh Mishra conceived the idea and developed a thorough study plan. He downloaded report cards from the university's official website, entered data into SPSS 20.0, and performed statistical calculations. Dr. Ankur Agrawal extracted high-quality research papers from reliable sources, filtered them, and identified gaps in the existing body of knowledge. Both authors thoroughly reviewed previous publications before developing research questions and hypotheses for the study. The manuscript was co-written and edited by both authors.

## Conflict of Interest

The authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

## Funding Acknowledgment

The authors received no financial support for the research, authorship, and/or for the publication of this manuscript.

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## PRABANDHAN : INDIAN JOURNAL OF MANAGEMENT

Statement about ownership and other particulars about the newspaper "PRABANDHAN: INDIAN JOURNAL OF MANAGEMENT" to be published in the 3<sup>rd</sup> issue every year after the last day of February.

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|    |                                            |   |                                |
|----|--------------------------------------------|---|--------------------------------|
| 1. | Place of Publication                       | : | NEW DELHI                      |
| 2. | Periodicity of Publication                 | : | MONTHLY                        |
| 3. | 4,5 Printer, Publisher and Editor's Name   | : | S. GILANI                      |
| 4. | Nationality                                | : | INDIAN                         |
| 5. | Address                                    | : | Y-21,HAUZ KHAS, NEW DELHI - 16 |
| 6. | Newspaper and Address of individual        | : | ASSOCIATED MANAGEMENT          |
|    | Who owns the newspaper and partner of      | : | CONSULTANTS PRIVATE LIMITED    |
|    | Shareholder holding more than one percent. | : | Y-21, HAUZ KHAS, NEW DELHI-16  |

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