



# Using the path analysis model to identify the factors influencing the increase in the number of private colleges in Iraq

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## Abstract

The roots of current pathway research began with the evolutionary genetics work of Sewall Wright in the 1920s. The method, a powerful statistical tool for analyzing the labyrinthine architecture of causal interactions between variables (and widely used since its first appearance), was otherwise bridging path choice analysis from natural science and Kermis & Wilson (1985). Direct development of previous work on environmental assessment. According to this article, there are three types of variables: independent (causes), dependent (consequences) and mediators (mediators associated with both causes and consequences). Path analysis shows distinguish between (a) direct effects, meaning that variables influence each other directly and (b) indirect effects caused by other mediating factors such as mediators. He explores what Charles Goodwin calls the graphic expression of research in image formation, disease diagnosis, and objective population studies as opposed to more traditional, pedagogical research studies ethnology or secondary education contradict each other' (ibid.). Implement the Best Practical Options The purpose of this study is to identify how human aspects will affect the possibility of creative learning in a range of colleges. Care should be taken to include the effects of multiple events that affect complex social issues such as private school attendance, and to ensure that statistics are interpreted and can be interpreted using R-square values or coefficients.

**Key words:** path. Factors influencing.

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## I. Introduction

This is for a variety of reasons; Increased demand, government policies affecting the development of private sector and other social factors are the main drivers. This article will walk you through the parts that make up America's private colleges and universities. Al-Buhaisi made this point in 2015. Meanwhile, one of the reasons why we see such an increase in the number of private colleges in Iraq is due to the consumer demand for higher education by the Iraqi public. Most Iraqis are pursuing higher education to get their jobs, corporate ladder. It helps to climb to the top. This is happening in a country after years of turmoil and stability. As competition for higher education heats up, many students yearn for what public colleges alone can only ever satisfy. Private schools should have no doubts about their worth based on college enrollment requirements who are often attracted to those who will not give it. Other private organizations have been established in the past with the help of Iraqi government programs. A new law passed by the Iraqi government to increase university enrollment and help private institutions grow. Some of these laws aimed at improving the process of creating private universities, and objective others are to encourage public-private partnerships for early years provision. This allows more private colleges and universities to enter the market, they can compete more effectively for student credit hours (the actual number is another story). Economically, the country's growth has led to the expansion of Iraqi private colleges. The country's economy has grown in recent years — the result of increased oil production and exports, investments in things like port operations or construction projects. Marau land department and other manufacturing companies other things also flourish the economy grew, more college campuses were founded, private investors cashed in on the rising demand for higher education. The increasing disposable income levels in Iraq are also fueling this sector as more students affording private university tuition. The declaration was made by al-Boshai in 2015. Several social factors contributed to the formation of private enterprises in Iraq.

After these years, and in a rapidly urbanizing society with technological advances that make the traditional degree more central to professional and social development, it has only recently been adopted. For these reasons, families are increasingly looking to the private sector as an alternative to public schools. The internet and other forms of globalization have brought great prosperity to students in Iraq and around the world, and according to many sources, there are many reasons for the growth of private education in Iraq but one is that its education system has become decentralized . . . . BIG also means that local government and private organizations will have more power, responsibility in education; thereby increasing the space for setting up of private colleges at regional and urban levels as well. This has created many learning opportunities to cater to the ever different student. A combination of factors has contributed to the current environment hospitable to the expansion of the private higher education sector in Iraq, most notably, including government policies, economic conditions and social challenges, high levels of demand when Iraq is modernizing and developing The campaign continues and so does they thought of creating a growing number of private institutions including providing more opportunities for students seeking the highest level of education and thus not its not only the economy but also the lives of Iraqis have improved. Othman (2005).

### **Factors affecting the increase in the number of private colleges in Iraq**

#### **Demand for higher education:**

This has led to the rise of several private schools in Iraq, most of which offer bachelor's degrees aimed at young people seeking better opportunities in their fields. The desire for higher education has led Iraq to turn to private colleges, which generally offer quality education. Especially for those young people who are so hungry to boost their career prospects. Despite the high cost of attending a public college, such schools offer a degree-earning option for those who prefer or cannot afford more traditional options according to Othman (2005). Iraq's dynamic job market has always been one of the main factors pushing people to higher education, as is Iraq's need for technically skilled young people. As the country looks to modernize and diversify its economy, local demand for locally skilled workers is increasing. As a result, the number of students attending colleges and universities has expanded dramatically due to the belief among young people that more higher education degrees are necessary to secure well-paying jobs. Attention to this need from private universities is evident in the expansion of their degree offerings, some now offering courses designed to celebrate not only indigenous but culturally and ethnically diverse CorsicaSaa institution these types act as the gateway to the job market and tend to focus on areas such as retail, industrial and healthcare. Private colleges help students succeed by providing them with a career-oriented future education. On the other hand, private universities besides focusing on career-oriented curriculums are able to offer flexibility and flexibility to students facing work or family demands Most private universities offer online courses, evening and week end systems accessible for . This option is important for students who live far away or don't have the financial resources to attend traditional institutions. Elgan (1983) Small class sizes at private universities also enable students to spend more one-on-one time with the professor. One of them is a traditional school where the kids don't get as much individual attention as they want because it's something bigger with fewer teachers. Professors at private universities are top researchers in their fields, so students can gain valuable advice and insight on how to take the next step in their careers. Despite all the advantages that private universities offer students in terms of educational opportunities, there must be a few problems that need to be solved if these schools are to truly provide the best education possible. Accreditation is a legitimate concern because not all private institutions are held to the same standards as public universities. In order for potential employees to rely on private colleges, students should check their accreditation status and do their homework before enrolling. Not to mention, many students, especially those from low-income families, find the cost of private education to be a barrier. While some private institutions may offer financial aid in the form of scholarships or grants, the total cost of tuition can be higher than at public universities and for students who are already struggling financially this can be a major barrier preventing them from attending college. Despite these obstacles, the recent growth of private universities in Iraq is making encouraging cases for young people's future career and higher education options. Private institutions offer flexible degree programs compared to public universities, helping to close the gap between what employers need and what today's grades actually have The future of Iraq's economy and workforce will be heavily influenced by individuals universities' commitment to higher education.

#### **Government policies:**

Several private universities in Iraq recently opened their doors to students, thanks to easing restrictions imposed by the government. Examples of such strategies include relaxing rules governing private schools or providing financial incentives to schools that meet certain criteria. Policies and regulations on public and private education have had a profound effect on the establishment and development of private universities in Iraq. These organizations have thrived thanks to supportive policies of the government, enabling them to thrive. For example, the government can offer subsidies, tax breaks, or subsidies to attract and support private firms.

Streamlining accreditation processes by reducing bureaucratic barriers and allowing institutions to focus on their core purpose can help start and expand private colleges. Aglan's 1983 relaxation of private school rules is another important consideration. New universities could open their doors if governments ease or remove regulations that have long restricted the operation of private schools. For example, regulations on teacher recruitment and training may be relaxed, or the number of students allowed to enroll may be restricted. If the government does this to encourage innovation and competitiveness in education with more options and better education for students. Government actions by creating a more favorable regulatory environment can also influence the expansion of private universities. For example, the government should provide more clear rules for private colleges to provide a framework. Curriculum standards, student hiring practices, and budgeting practices are all examples of what might trigger this category. In this way, governments can ensure that students get the best education from private universities and also encourage them to be open and honest. In addition, the sprouting of private universities in Iraq may be shaped by government policies. The government can offer scholarships and financial aid to students from underrepresented groups, or provide a substantial amount of education for a subject. This could pave the way for more private universities to offer degree programs that tailored to the requirements of their classes. Indirectly through their macroeconomic and social policies, government policies can influence the expansion of private firms in addition to these direct incentives. For example, if a country's economy looks good in the future, private universities may see an uptick in business due to foreign investment and an influx of top talent. Demand for higher education among historically marginalized groups may increase in response to social policies that promote gender equality or social mobility. According to Ajlan (1983), the private education sector in Iraq is heavily influenced by government policies and policies. By introducing an industry-friendly regulatory framework, it can encourage private college construction and growth, as well as education sector competition and innovation.

#### **Cooperation with international institutions:**

Private universities and colleges in Iraq can partner with other institutions around the world to achieve greater prestige and attract students seeking international education. Iraqi private schools have a great opportunity to enhance their image, establish strategic links with foreign universities and recruit a diverse student body seeking an internationally recognized education. Private colleges in Iraq can collaborate with universities around the world to improve their curriculum and international reputation. This allows them to use new resources, acquire specialized knowledge, and expand their networks. (Omar, 2014) There are various forms of cooperation, such as programs that enable students to change schools, projects including joint research efforts and curriculum development. For example, students in Iraq and private universities can affect their communities there and international degree requirements together by developing dual degree programs with international partners. This has the potential to expose students to different teaching methods, cultural perspectives and research possibilities in addition to broadening their studies. The quality of education provided by private Iraqi universities can be enhanced through cooperation with foreign institutions. Working with global experts gives faculty access to the latest research and best practices in their field, allowing them to update their teaching strategies and incorporate new perspectives into their courses. Opportunities for increased student mobility and global connectivity are another important benefit of links with foreign schools. Iraqi private colleges can partner with schools around the world to help their students become global. This way, students can experience overseas projects or internships, or even compete at the top level in international events and competitions. This will help students become more globally aware, able to understand and appreciate other cultures, and better equip them to succeed in today's globally interdependent world. Not only can Iraqi private colleges reap these academic advantages, they can also enhance their legitimacy and prestige by establishing relationships with foreign universities. Private schools can demonstrate their commitment to academic excellence and educational excellence through partnerships with globally respected institutions. The college market is becoming increasingly competitive, as is the number of students seeking higher education. (Omar, 2014) Iraqi private colleges can gain prestige, attract students seeking international education, establish relationships with foreign universities and offer globally recognized degrees. Private colleges can improve their students' educational experience by on collaboration with internationally recognized universities and schools. These networks provide private colleges with new resources, knowledge and connections.

#### **Technological progress:**

Using online programs and virtual classrooms, private universities in Iraq have been able to expand their student body and attract more students thanks to technological advances.

Thanks to new technologies developing as fast as lightning, private institutions in Iraq have been able to expand their student body and increase enrollment and this has completely changed the landscape of higher education in the country. Virtual classrooms and other forms of online education have opened heretofore unimagined avenues for private schools to access students from around the world, regardless of location.

Colleges can now reach people that were previously unreachable due to factors such as distance or cost, all thanks to the digital revolution. (Omar, 2014) Private colleges in Iraq are now able to offer self-paced, customizable education to students due to the wide availability of online learning options and resources. This means that students can achieve their learning objectives without increasing their lives. Because of this, these schools have expanded tremendously, attracting students from across the country and around the world. The number of potential students has grown even more due to the convenience and accessibility of online programs, allowing working professionals, stay-at-home parents, and others with other responsibilities to complete their education.

Private universities in Iraq have also benefited from technological advances, enabling innovative teaching methods, providing students with active and engaging learning opportunities Digital technology teachers virtual simulations, multimedia content that students can interact with connections, and collaborative spaces Because of this, students are able to learn at their own pace, review previously discussed material, and interact with teachers and peers from around the world, all of which contribute to learning is well out of it Since you don't have a physical university, you don't need as much money on real estate , infrastructure and public utilities. The cost-effectiveness of these services has improved the quality of education due to the increased ability of private institutions to invest in curriculum, teacher development, and student services In addition to these benefits, online education greater availability has led to a shift towards more personalized student-centered curricula. Teachers can better meet the needs of their students by providing flexible lesson plans driven by artificial intelligence with targeted feedback and support to tailor their lessons based on the specific needs of each student. This shift towards personalized education considering each student's background, characteristics and learning style has resulted in better academic outcomes (Waleed, 2004) New opportunities have emerged for private colleges in Iraq due to technological advances in in online learning therefore. These institutions can now provide a more personalized, more accessible and flexible learning experience for a wider range of students. The growth and development in this field is expected to be such that private colleges can adapt and innovate in response to ever-evolving technology.

#### **Economic factors:**

One of the factors that may affect the expansion of private universities in Iraq is access to finance and education-related investments A strong and growing economy could attract more investors to support private schools, new and old.

Availability of funds and the ability to invest are essential for starting and developing private universities in Iraq, which in turn affects the economic situation of the country Private schools can thrive in a stable and growing economy because it lies revealed that investors will invest in the project. Because of this, private universities are able to invest heavily in their facilities, their faculty and student facilities, thereby improving the educational standards of their students

Students seeking higher education will have more options if entrepreneurs and investors are encouraged to initiate private sector innovation to access financial resources. Investors prefer to invest in educational projects when the economy is doing well because they can see a long-term return on their investment. Higher education competing for students can respond to this influx of capital by innovating and raising its standards. (Walid, 2004) Moreover, private universities can benefit from more government investment in education if the economy is stable. More funding for public schools means that private universities can collaborate with public schools, pooling resources and joint research projects. Public and private schools can also reap the benefits of this partnership in developing new programs and courses designed to meet the demands of students and industry. The increased importance of higher education services is another potential outcome of a growing economy. As the economy grows, there is often a demand for skilled workers with specialized knowledge and skills. This is an opportunity for private universities to adapt their curricula to the requirements of new fields such as renewable energy, health and technology. In a growing economy, private universities and colleges offering quality degree programs can best meet the shortage of qualified workers. In addition, general growth in business enables private firms to operate more efficiently in an economically stable environment. Private universities can better manage their funds, invest in innovation and compete for better faculty and students if funds are stable, inflation is low and taxes are favorable Consequently, faculty can raise their concerns if about economic stability have been laid down and they devote their time and energy to teaching and researching Shakyante (Waleed, 2004) .

On the other hand, private universities may feel a small amount of financial uncertainty. Investors may be reluctant to invest in schools in countries with unstable governments, high inflation, or currency fluctuations. For this reason, few new private colleges may be established and existing ones may receive limited funding. Reducing spending on programs and services is a real possibility for private universities. Complex economic issues affecting private universities in Iraq. The capacity of these organisations to expand and thrive is highly dependent on the accessibility of finance and investment possibilities. Improved educational results and better

access to higher education for Iraqi students may be achieved through economic stability and prosperity, which attract more investors to fund the establishment and expansion of private educational institutions.

### **Using path analysis to identify the factors affecting the increase in the number of private colleges in Iraq**

Path analysis is the statistical methods used to study the analysis of correlation coefficients between two variables with two types of direct and indirect effects This is for the variables Allows the identification of the correlation structure linking them internally and influence and feedback This study used this approach to identify the direct and indirect factors affecting the academic achievement of a sample of Shendi University students.

#### **Previous studies:**

In (2010), researcher Dhnoon Younis Dhanoon Al-Shakarji conducted a study titled Study of direct and indirect effects of variables affecting the academic level of institute students using path analysis, published in Iraqi Journal of Statistical Sciences It helps to hear direct and indirect under mean effects, in addition to determining the extent of each variable's effect and its significance for the student's final grade. In year 2 (2014), researcher Alaa Abdullah Al-Haj conducted a study titled Using Path Analysis to Study Factors Affecting Inflation, where causal models were developed and SPSS was used to obtain statistical models for each model under consideration , from data obtained from the Central Bank of Sudan , concluded that growth rate Significant direct effects of money supply, exchange rate and exports above, and significant indirect effects of currency supply, exchange rates and imports on prices Alaa Naeem Al-Buhaisi in (2015) Using path research to study the factors affecting the cumulative number of graduate students, applied research, . al- Azhar University, Gaza, Palestine.

#### **A brief history of path analysis**

Path analysis is one of the advanced techniques for investigating relationships between variables and reflects the extended data of multiple linear regression analysis Sewal Wright first conducted this analysis in 1921 to study how animals of the emergence and development of species. 2014) Statistical method based on multiple regression and correlation analysis is used to establish the probability of causal relationship between variables, as it allows to observe variables in terms of effect and response and their joint relationship

#### **Definition of path is The line connecting one variable to another.**

##### **Definition of path analysis**

A statistical approach based on regression analysis and multiple correlations is established to establish the probability of causal relationships between variables as it allows the identification of intra-structural relationships linking them in effect and response , and variables are represented by an effect path diagram ending from the independent variable to the dependent variable

#### **Variables are classified into:**

##### **1. Independent variable**

It is called a causal variable because it introduces additional variables into the model. It is also called an external variable because its value is determined after the observation and thus acts as a source of additional variables.

##### **2. Dependent Variable**

It is called the affected variable as the variable that represents the sum of the effects of other variables in the model and is also called the internal variable because its values are determined inside the model.

##### **3. Intermediate dependent variable:**

It is a variable that is influenced by the independent variable and affects the dependent variable.

#### **Influences between variables are categorised into: -**

1. Direct effects are the direct effect of the cause on the effect
2. Indirect effects are the indirect effects of the cause on the effect through pathways (via other causes).

#### **There are several models in path analysis:**

##### **1. Unidirectional model**

This model includes one direction for paths from the independent variables to the dependent variables and the path is determined by a specific direction and a specific value called the path coefficient.

##### **2. Group model**

It includes several dependent variables related to the same set of independent variables.

3. The unidirectional collective model combines the unidirectional and collective models into one model.

4. Interdependency Model

Going beyond a simple separation of dependent and independent variables, path analysis seeks to reveal the complex relationships and effects between the variables under investigation. The use of the SPSS LISREL tool is essential while dealing with most variables due to complexity. When determining the extent to which external variables such as independent variables influence internal variables such as dependent variables, an important assumption is made: If the null hypothesis is set, it is expected that the method the dimension value becomes zero. Further investigation of the interactions and effects of complex variables is needed to ensure that this assumption is not violated, that is, if the coefficient value of the path is nonzero.

#### **Steps to build a path analysis model:**

- Build a causal model.
- Create a pattern of relationships between variables in order.
- Draw a schematic model of the path of the relationships between the variables.
- Calculate path coefficients.
- Selecting a good fit to the underlying model.
- Analyse and interpret the results.
- Path Coefficients Calculating
- Correlation Coefficients

#### **Graphical representation**

A path diagram is a tool for showing cause and effect, or possible relationships between exogenous and endogenous factors, in a hypothetical setting. It studies the direct and indirect effects of model variables and uses arrows and paths to find relevance. We will use the R programming language to analyze the factors that led to the proliferation of private schools in Iraq.

#### **Firstly: Using regression analysis through the R language**

##### **First: Regression analysis:**

To perform a regression analysis to find out the factors influencing the increase in the number of private colleges in Iraq using the R language, you can follow the following steps:

```
data <- read.csv("path_to_your_data.csv")
```

##### **Build a linear regression model:**

We shall take it as read that factors like population, median income, education level, youth ratio, and quantity of high schools might influence the amount of private colleges.

##### **Building a Linear Regression Model**

```
model <- lm(num_private_colleges ~ population + avg_income +  
education_level + youth_percentage + num_high_schools, data =  
data) coefficients <- coef(model) coefficients
```

##### **View Predictive Values**

```
predicted_values <- predict(model, data) data <- data %>%  
mutate(predicted_colleges = predicted_values).
```

statement showing predictive versus actual values

```
ggplot(data, aes(x = num_private_colleges, y = expected_colleges)) +  
geom_point() + geom_abline(slope = 1, intercept = 0, colour = "red") +  
labs(address = Actual vs. predictive values for the number of private  
colleges", x = "Actual number of private colleges", y =  
"predicted number of private colleges").
```

### **Interpreting the results:**

#### **Model summary:**

- R-squared measures the amount of variation in the number of individual colleges that can be estimated by the dependent variables. P-values are used to evaluate the null hypothesis that the regression coefficients are exactly zero, indicating no effect on the independent variable. A P-value of less than 0.05 indicates that the independent variable has a statistically significant effect on the dependent variable.

- The coefficient shows the effect of each independent variable on the dependent variable. A positive regression coefficient indicates a positive effect and vice versa.

Using this model, you can identify the factors that contribute significantly to the rise in the number of private colleges in Iraq.

#### **Secondly: Multiple Correlation: Using the R language**

To create a Multiple Regression model using the R language to find out the factors influencing the increase in the number of private colleges in Iraq, we will perform the following steps:

#### **Build the multiple linear regression model:**

We will assume that the variables that can affect the number of private colleges include population, average income, education level, youth ratio, and number of high schools.

# Build the multiple linear regression model

```
model <- lm(num_private_colleges ~ population + avg_income +  
education_level + youth_percentage + num_high_schools, data = data)
```

Check for missing values `sum(is.na(data))`

Build a multiple linear regression model

```
model <- lm(num_private_colleges ~ population + avg_income +  
education_level + youth_percentage + num_high_schools, data = data)
```

Display predicted values

```
predicted_values <- predict(model, data) data <- data %>%  
mutate(predicted_colleges = predicted_values)
```

A statement showing predicted values versus actual values

```
ggplot(data, aes(x = num_private_colleges, y = predicted_colleges)) +  
geom_point() + geom_abline(slope = 1, intercept = 0, colour = "red") +  
labs(title = "Actual vs. predicted values of the number of private  
colleges", x = "Actual number of private colleges", y = "predicted  
number of private colleges").
```

### **Interpreting the results:**

#### **Summary of the model:**

**R-squared:** expresses the proportion of variance in the dependent variable (number of private colleges) that can be explained by the independent variables.

**P-Values:** Used to test the null hypothesis that the regression coefficients are zero (no effect of the independent variable). If the p-value is less than 0.05, it indicates that the independent variable has a significant effect on the dependent variable.

**Coefficients:** Shows the effect of each independent variable on the dependent variable. A positive regression coefficient indicates a positive effect and vice versa.

Using this model, you can identify the factors that significantly contribute to the increase in the number of private colleges in Iraq.

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