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***V.V. TOKAR,***
*Doctor of Sciences, Full Professor,*
*Kyiv National University of Trade and Economics*

# THE INTERPLAY BETWEEN GLOBAL CONSULTING SERVICES AND ECONOMIC GROWTH

The Covid-pandemic forces governments, individuals, and legal entities to transit from business-as-usual approach to digital, inclusive, innovative, and adaptive management and producing models. Maintaining the old ways of decision-making became increasingly difficult, if not impossible. The lack of adequate knowledge, know-how and time deficit increases the demand for professional advice from peers or individuals and companies specialized in consulting services in different spheres, including management in general, personnel, information technologies, security, etc. The global consulting services industry in general and its most successful representatives, both individuals and firms, seem to prosper in any case, but the question is whether their consultancy really improves business results and stimulates economic growth.

The article aims are disclosing the connection between global consulting services and economic development applying correlation analysis to the size of global consulting services market and the World Bank's data on GDP. The paper discloses recent changes in the size of global consulting services market and world GDP growth.

The size of global consulting services markets constantly grew and the change equaled 44.4 percent in 2011–2020. Financial advisory and operations consultancy were the fastest growing segments demonstrating the increase of 54.5 and 53.6 percent, respectively. The global GDP increased by 14.2 during this period reaching $83.8 trillion in 2020 and showing the peak of $87.6 trillion in 2019. Our calculations have shown that the linear correlation coefficient of the size of global consulting services market and world GDP is statistically significant. Therefore, there is a direct and strong connection between consulting services and economic growth, namely the global GDP.

The increase of the size of global consulting services market by 1 unit ($1 billion) causes the average increase of the world GDP by 0.139 units ($ trillion). The perspectives of further investigations embrace the analysis of efficiency of consulting services in key segments of the global market, namely strategy, operations, human resources, financial advisory, and technology.

***Key words:*** *consulting, consulting companies, consulting services, consulting services industry, economic growth, global GDP.*

Пандемія Covid змушує уряди, фізичних та юридичних осіб перейти від звичного для бізнесу підходу до цифрових, інклюзивних, інноваційних та адаптивних моделей управління та виробництва. Збереження старих способів прийняття рішень стає дедалі складнішим, а то й неможливим. Відсутність належних знань, ноу-хау та дефіцит часу збільшує попит на професійну консультацію з боку однолітків або приватних осіб та компаній, що спеціалізуються на консалтингових послугах у різних сферах, включаючи управління загалом, персонал, інформаційні технології, безпеку тощо. Глобальні консалтингові послуги промисловість загалом та її найуспішніші представники, як при-

 

ватні особи, так і фірми, здається, процвітають у будь-якому випадку, але питання полягає в тому, чи справді їхні консультації покращують результати бізнесу та стимулюють економічне зростання.

Метою статті є розкриття зв'язку між глобальними консалтинговими послугами та економічним розвитком, застосовуючи кореляційний аналіз до розміру світового ринку консалтингових послуг та даних Світового банку щодо ВВП. У статті аналізуються зміни в розмірах світового ринку консалтингових послуг та зростання світового ВВП.

Розмір світового ринку консалтингових послуг постійно зростав упродовж 2011–2020 рр., при цьому за цей період зміна склала 44,4%. Фінансові та операційні консультації були найбільш швидкозростаючими сегментами, продемонструвавши зростання відповідно на 54,5 та 53,6%. Світовий ВВП за цей період зріс на 14,2%, досягнувши 83,8 трлн дол. США у 2020 р. та продемонструвавши найвищий показник у 87,6 трлн дол. США у 2019 р. Наші розрахунки показали, що коефіцієнт лінійної кореляції розміру світового ринку консалтингових послуг та світового ВВП є статистично значущим. Отже, існує прямий і міцний зв'язок між консалтинговими послугами та економічним зростанням, а саме світовим ВВП.

Збільшення розміру світового ринку консалтингових послуг на одиницю (1 млрд дол. США) спричиняє середнє збільшення світового ВВП на 0,139 одиниці (трлн дол. США). Перспективи подальших досліджень охоплюють аналіз ефективності консалтингових послуг у ключових сегментах світового ринку, а саме стратегіях, операціях, людських ресурсах, фінансових консультаціях і технологіях.

***Ключові слова:*** *консалтинг, консалтингові компанії, консалтингові послуги, галузь консалтингових послуг, економічне зростання, світовий ВВП.*

**Introduction**. The Covid-pandemic forces governments, individuals, and legal entities to transit from business-as-usual approach to digital, inclusive, innovative, and adaptive management and producing models. Maintaining the old ways of decision-making became increasingly difficult, if not impossible. The lack of adequate knowledge, know-how and time deficit increases the demand for professional advice from peers or individuals and companies specialized in consulting services in different spheres, including management in general, personnel, information technologies, security, etc. The global consulting services industry in general and its most successful representatives, both individuals and firms, seem to prosper in any case, but the question is whether their consultancy really improves business results and stimulates economic growth.

**Analysis of recent achievements and publications.** The economic literature focuses mainly on factors influencing decision-making and consultancy efficiency. For instance, Poorani and Thiyagarajan [1] assert that e-consulting minimizes problems and improves the value creation in business. O. Ploetner [2] pinpointed challenges for goods-producing companies entering business management consulting markets. The seminal work of Basil, Yen and Tang [3] laid the foundations for setting criteria and evaluating potential IT consulting companies.

Chrisman [4] argues that successful consulting services depend on the right combination of consultants (experts in certain spheres), clients (understanding their real needs), and ventures (types of business). Klarner, Sarsted, Hoeck, and Ringle [5] demonstrate that client communication and team adaptability are the key factors explaining the interplay between management consulting teams' competences and their performance.

In contrast to the extensive body of literature on female and gender studies, Chrisman, Carsrud, de Castro, and Herron [6] found little evidence of efficiency of special attitude or special business programs for females, including consultancy. Thus, the authors recommended to concentrate on behavioral and strategic factors rather than personal features of entrepreneurs while providing consulting services.

Wright, Sturdy, and Wylie [7] observe that there is a strong connection between management innovation and standardization introduced by business consultants. Wenhong and Liberatore [8] stress the importance of coordinating efforts between clients and IT consultants, in other words, client project success and achievement of IT consultant goals are interconnected. In turn, Sieweke, Birkner, and Mohe [9] propose to form a service triad consisting of purchasing professionals, managers, and consultants to guarantee the efficiency of consulting services. Maclagan [10] declares that ethical business consultants should be competent, not to misrepresent their capabilities, and consider conflicts of interests within companies.

Despite apriori implication that consulting services result in positive changes in business performance and economic growth, it is high time to cast doubt on their real efficiency.

**The research purpose and relevance.** The article aims are disclosing the connection between global consulting services and economic development applying correlation analysis to the size of global consulting services market and the World Bank's data on GDP. The paper discloses recent changes in the size of global consulting services market and world GDP growth.

**Statement of the primary research material.** Table 1 shows that the size of global consulting services market constantly grew and the change equaled 44.4 percent in 2011–2020. Financial advisory and operations consultancy were the fastest growing segments demonstrating the increase of 54.5 and 53.6 percent, respectively.

*Table 1*

**Size of global consulting services market by segments in 2011–2020, $ billion**

| Period | Strategy | Operations | Human Resources | Financial Advisory | Technology | Total |
|---|---|---|---|---|---|---|
| 2011 | 26 | 56 | 25 | 55 | 43 | 205 |
| 2012 | 27 | 59 | 26 | 58 | 44 | 214 |
| 2013 | 27 | 61 | 27 | 61 | 45 | 221 |
| 2014 | 28 | 64 | 28 | 64 | 46 | 230 |
| 2015 | 29 | 67 | 30 | 67 | 47 | 240 |
| 2016 | 31 | 71 | 31 | 70 | 48 | 251 |
| 2017 | 32 | 75 | 32 | 74 | 49 | 262 |
| 2018 | 33 | 78 | 34 | 77 | 50 | 272 |
| 2019 | 34 | 82 | 36 | 81 | 52 | 285 |
| 2020 | 35 | 86 | 37 | 85 | 53 | 296 |
| Change, % | 34.6 | 53.6 | 48.0 | 54.5 | 23.3 | 44.4 |

*Source*: own calculations and compilation based on [11].

Table 2 presents data on the world GDP changes in 2011–2019. We can see that the global GDP increased by 14.2 during this period reaching $83.8 trillion in 2019 and showing the peak of $87.6 trillion in 2019.

*Table 2*

**Global GDP, $ trillion**

| Period | Strategy |
|---|---|
| 2011 | 73.4 |
| 2012 | 74.8 |
| 2013 | 77.0 |
| 2014 | 79.1 |
| 2015 | 74.8 |
| 2016 | 76.0 |
| 2017 | 80.7 |
| 2018 | 85.7 |
| 2019 | 87.6 |
| 2020 | 83.8 |
| Change, % | 14.2 |

*Source*: own calculations and compilation based on [12].

We apply the linear pairwise regression analysis to determine the type and strength of connection between the global consulting services and GDP growth. Table 3 contains data for calculating the regression parameters.

*Table 3*

**Data for calculating the regression parameters**

| x (consulting) | y (GDP) | $x^2$ | $y^2$ | x*y |
|---|---|---|---|---|
| 205 | 73.4 | 42025 | 5387.56 | 15047 |
| 214 | 74.8 | 45796 | 5595.04 | 16007.2 |
| 221 | 77 | 48841 | 5929 | 17017 |
| 230 | 79.1 | 52900 | 6256.81 | 18193 |
| 240 | 74.8 | 57600 | 5595.04 | 17952 |
| 251 | 76 | 63001 | 5776 | 19076 |
| 262 | 80.7 | 68644 | 6512.49 | 21143.4 |
| 272 | 85.7 | 73984 | 7344.49 | 23310.4 |
| 285 | 87.6 | 81225 | 7673.76 | 24966 |
| 296 | 83.8 | 87616 | 7022.44 | 24804.8 |
| 2476 | 792.9 | 621632 | 63092.63 | 197516.8 |

*Source*: own calculations.

We receive the following parameters of the regression:
Sample averages:

$$\overline{x} = \frac{\sum x_i}{n} = \frac{2476}{10} = 247.6;$$

$$\overline{y} = \frac{\sum y_i}{n} = \frac{792.9}{10} = 79.29;$$

$$\overline{xy} = \frac{\sum x_i y_i}{n} = \frac{197516.8}{10} = 19751.68.$$

Sample variances:

$$S^2(\mathrm{x}) = \frac{\sum x_i^2}{n} - \overline{x}^2 = \frac{621632}{10} - 247.6^2 = 857.44;$$

$$S^2(\mathrm{y}) = \frac{\sum y_i^2}{n} - \overline{y}^2 = \frac{63092.63}{10} - 79.29^2 = 22.36.$$

Standard deviation:

$$S(x) = \sqrt{S^2(\mathrm{x})} = \sqrt{857.44} = 29.282;$$

$$S(y) = \sqrt{S^2(\mathrm{y})} = \sqrt{22.36} = 4.729.$$

Regression coefficients a and b:

$$b = \frac{\overline{x \times y} - \overline{x} \times \overline{y}}{s^2(\mathrm{x})} = \frac{19751.68 - 247.6 \times 79.29}{857.44} = 0.1393;$$

$$a = \overline{y} - b \times \overline{x} = 79.29 - 0.1393 \times 247.6 = 44.7893.$$

The next step is to calculate the linear pairwise correlation coefficient:

$$r_{x,y} = b \times \frac{S(x)}{S(y)} = 0.139 \times \frac{29.282}{4.729} = 0.863.$$

Thus, the connection between attribute y (global GDP) and factor x (size of global consulting services market) is direct and strong.
We put forward the following hypotheses:
$H_0$: $r_{xy} = 0$, there is no linear relationship between variables;
$H_1$: $r_{xy} \neq 0$, there is a linear relationship between variables.
Our calculations of the observed error give us the following value:

$$t_{observed} = r_{x,y} \times \frac{\sqrt{n-2}}{\sqrt{1-r_{xy}^2}} = 0.863 \times \frac{\sqrt{8}}{\sqrt{1-0.863^2}} = 4.829.$$

Considering the degree of freedom k = n – 2 = 8 and the level of significance α = 0.05, the critical point value according to the Student distribution is:

$$t_{critical}\left(n-m-1;\frac{\alpha}{2}\right)=t_{critical}(8.0;0.025)=2.752$$

As $|t_{observed}| > t_{critical}$, then the correlation coefficient is statistically significant.

The elasticity coefficient is:

$$E=b\times\frac{\partial_y(x)}{\partial_x(y)}=0.139\times\frac{247.6}{79.29}=0.435.$$

As the elasticity coefficient is less than 1, it means that the 1 percent change of x (the size of global consulting services market) causes the change of y (world GDP) that is less than 1 percent, in other words, the impact of x on y is not essential.

We estimate the quality of the regression equation using the absolute approximation error:

$$\overline{A}=\frac{\sum|y_i-y_x|:y_i}{n}\times 100\%=\frac{0.25}{10}\times 100\%=2.5\%.$$

The calculated values deviate from the actual ones by 2.5%. Since the error is less than 7%, then this equation can be used as a regression.

The determination coefficient ($R^2$) equals to 0.7446, in other words, changes in x cause changes in y in 74.46% of cases.

$$R^2=0.863^2=0.7446.$$

The remaining 25.54% change in y is explained by factors not considered in the model (as well as specification errors).

We develop Table 4 as a calculation table to assess the quality of the regression parameters.

*Table 4*

**Calculation table to assess the quality of the regression parameters**

| x (consulting) | y (GDP) | y(x) | $(y_i-y_{average})2$ | $(y-y(x))^2$ | $\lvert y-y(x)\rvert:y$ |
|---|---|---|---|---|---|
| 205 | 73.4 | 73.354 | 34.692 | 0.00211 | 0.000625 |
| 214 | 74.8 | 74.608 | 20.16 | 0.0368 | 0.00256 |
| 221 | 77 | 75.584 | 5.244 | 2.006 | 0.0184 |
| 230 | 79.1 | 76.838 | 0.0361 | 5.118 | 0.0286 |
| 240 | 74.8 | 78.231 | 20.16 | 11.772 | 0.0459 |
| 251 | 76 | 79.764 | 10.824 | 14.166 | 0.0495 |
| 262 | 80.7 | 81.297 | 1.988 | 0.356 | 0.00739 |
| 272 | 85.7 | 82.69 | 41.088 | 9.061 | 0.0351 |
| 285 | 87.6 | 84.501 | 69.056 | 9.602 | 0.0354 |
| 296 | 83.8 | 86.034 | 20.34 | 4.991 | 0.0267 |
| 2476 | 792.9 | 792.9 | 223.589 | 57.111 | 0.25 |

*Source*: own calculations

An unbiased estimate of the variance of disturbances is:

$$S^2 = \frac{\sum(y_i - y_x)^2}{n-m-1} = \frac{57.111}{8} = 7.139.$$

$S^2 = 7.139$ is the unexplained variance or variance of the regression error (a measure of the spread of the dependent variable around the regression line).

S = 2.67 is the standard error of the estimate.

$$S = \sqrt{S^2} = \sqrt{7.139} = 2.67.$$

The regression standard error is the measure of the dispersion of observational data from the modeled values. The lower the value of the standard error of the regression, the higher the quality of the model.

$S_a$ is the standard deviation of the random variable a.

$$S_a = S \times \frac{\sqrt{x^2}}{nS(x)} = \frac{\sqrt{621632}}{10 \times 29.282} = 7.194.$$

$S_b$ is the standard deviation of the random variable b.

$$S_b = \frac{S}{\sqrt{n}S(x)} = \frac{2.67}{\sqrt{10} \times 29.282} = 0.0289.$$

Using the least squares method, we have obtained only estimates of the parameters of the regression equation that are features of a particular statistical observation (a particular set of x and y values).

To assess the statistical significance of the regression and correlation coefficients, we apply the Student's t-test and the confidence intervals for each of the calculated indicators. The hypothesis $H_0$ states the random nature of the indicators, i.e., their insignificant difference from zero.

To check if the parameters are meaningful, i.e., whether they differ significantly from zero for the general population use statistical hypothesis testing methods.

We verify hypothesis $H_0$ about the equality of individual regression coefficients to zero (with the alternative $H_1$ that they are not equal to zero) at the significance level $\alpha = 0.05$.

$H_0$: b = 0, that is, there is no linear relationship between the variables x and y in the general population;

$H_1$: $b \neq 0$, that is, there is a linear relationship between the variables x and y in the general population.

If the main hypothesis turns out to be wrong, we accept the alternative one.

We apply the Student's t-test to verify this hypothesis.

If the actual value of the t-criterion is less than the tabular one (in absolute value), then there is no reason to reject the main hypothesis, i.e., parameter or statistical characteristic in the general population does not differ significantly from zero at the significance level α.

$$t_b = \frac{b}{S_b} = \frac{0.139}{0.0289} = 4.83.$$

Since 4.83> 2.752 the statistical significance of the regression coefficient b is confirmed (we reject the hypothesis that this coefficient equals to zero).

$$t_a = \frac{a}{S_a} = \frac{44.789}{7.194} = 6.23.$$

Since 6.23> 2.752 the statistical significance of the regression coefficient a is confirmed (we reject the hypothesis that this coefficient equals to zero).

The confidence intervals of the regression coefficients with a reliability of 95% will be as follows:

$(b - t_{critical} \times Sb; b + t_{critical} \times Sb) = (0.14 - 2.752 \times 0.0289; 0.14 + 2.752 \times \times 0.0289) = (0.0599; 0.219)$

$(a - t_{critical} \times S_a; a + t_{critical} \times S_a) = (44.789 - 2.752 \times 7.194; 44.789 + 2.752 \times \times 7.194) = (24.991; 64.588)$

We assume that the value of b will be within (0.0599; 0.219) and the value of a will be within (24.991; 64.588) with the probability of 95%.

We apply the Fisher's F-test to check the significance of the regression model.

If the calculated value with $k_1 = (m)$ and $k_2 = (n - m - 1)$ degrees of freedom is greater than the tabular value for a given significance level, then the model is considered significant.

$$F = \frac{R^2}{1-R^2} \times \frac{n-m-1}{m} = \frac{0.7446}{1-0.7446} \times \frac{10-1-1}{1} = 23.32.$$

The tabular value of the F-criterion with degrees of freedom $k_1 = 1$ and $k_2 = 8$, $F_{table} = 5.32$. Since the actual value $F > F_{table}$, the coefficient of determination is statistically significant (the determined estimate of the regression equation is statistically reliable).

We apply the variance decomposition theorem to determine the quality of the regression model. The total variance of the effective indicator can be decomposed into two components – explained and unexplained by the variance regression equation ones.

We determine the variance of the dependent variable (Table 5):

$\sum(y_i - y_{average})^2 = \sum(y(x) - y_{average})^2 + \sum(y - y(x))^2$

Where:

$\sum(y_i - y_{average})^2$ – total sum of squares of deviations;

$\sum(y(x) - y_{average})^2$ – sum of squares of deviations due to the regression ("explained" or "factorial");

$\sum(y - y(x))^2$ – residual sum of squares of deviations.

*Table 5*

**The variance decomposition**

| Source of variation | Sum of squares | Number of degrees of freedom | Dispersion per 1 degree of freedom | F-criterion |
|---|---|---|---|---|
| Model (explained) | 166.478 | 1 | 166.478 | 23.32 |
| Residual | 57.11 | 8 | 7.14 | 1 |
| General | 223.59 | 1–10 | – | – |

*Source*: own calculations.

Table 6 contains the general indicators of the quality of our regression.

*Table 6*

**Indicators of the quality of the regression**

| Indicator | Value |
|---|---|
| Determination coefficient | 166.478 |
| Average elasticity coefficient | 57.11 |
| Average approximation error | 223.59 |

*Source*: own calculations.

## Conclusions

Our calculations have shown that the linear correlation coefficient of the size of global consulting services market and world GDP is statistically significant. Therefore, there is a direct and strong connection between consulting services and economic growth in terms of the world GDP. The increase of the size of global consulting services market by 1 unit ($1 billion) causes the average increase of the world GDP by 0.139 units ($ trillion). The perspectives of further investigations embrace the analysis of efficiency of consulting services in key segments of the global market, namely strategy, operations, human resources, financial advisory, and technology.

## *Bibliography*

1. Poorani T., Thiyagarajan S. Assessing value creation of HR consultants on e-consulting implementation. *Technology in Society.* 2018. № 55. P. 160–165.

2. Ploetner O. The development of consulting in goods-based companies. *Industrial Marketing Management*. 2008. № 37 (3). P. 329–338.

3. Basil P., Yen D.C., Tang H.-L. Information consulting: developments, trends and suggestions for growth. *International Journal of Information Management.* 1997. № 17 (5). P. 303–323.

4. Chrisman J.J. Strategic, administrative, and operating assistance: The value of outside consulting to pre-venture entrepreneurs. *Journal of Business Venturing.* 1989. № 4 (6). P. 401–418.

5. Klarner P., Sarsted M., Hoeck M., Ringle C.M. Disentangling the Effects of Team Competences, Team Adaptability, and Client Communication on the Performance of Management Consulting Teams. *Long Range Planning*. 2013. № 46 (3). P. 258–286.

6. Chrisman J.J., Carsrud A.L., Castro de J., Herron L. A comparison of assistance needs of male and female pre-venture entrepreneurs. *Journal of Business Venturing.* 1990. № 5 (4). P. 235–248.

7. Wright C., Sturdy A., Wylie N. Management innovation through standardization: Consultants as standardizers of organizational practice. *Research Policy.* 2012. № 41 (3). P. 652–662.

8. Wenhong L., Liberatore M.J. Achieving IT consultant objectives through client project success. *Information & Management.* 2009. № 46 (5). P. 259–266.

9. Sieweke J., Birkner S., Mohe M. Preferred supplier programs for consulting services: An exploratory study of German client companies. *Journal of Purchasing and Supply Management.* 2012. № 18 (3). P. 123–136.

10. Maclagan P. Methodology choice and consulting ethics in management science. *Omega.* 1989. № 17 (5). P. 397–407.

11. Size of global consulting market from 2011 to 2020, by segment(in billion U.S. dollars). *Statista.* URL: https://www.statista.com/statistics/624426/global-consulting-market-size-by-sector/ (Accessed 10 April 2021).

12. Global gross domestic product (GDP) at current prices from 1985 to 2025 (in billion U.S. dollars) *Statista.* URL: https://www.statista.com/statistics/268750/global-gross-domestic-product-gdp/ (Accessed 10 April 2021).