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# Exploring The Dynamics Between Innovation And Human Development: Evidence From OIC Member Countries

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**ABSTRACT**
The purpose of this study is to ascertain how the global innovation index, employment, inflation, and urban population all affect human development in a country. A sample of 13 member nations of the Organization of Islamic Cooperation (OIC) were chosen, the timeframe was between 2012 and 2021 using a purposive sample strategy. We utilized a quantitative approach and panel-balanced modeling approaches. The results demonstrate that while inflation has a negative impact on the Human Development Index (HDI), employment and urban development have a favorable impact, and Global Innovation has no effect on HDI. We restricted the sample to low-income and impoverished nations, as they make up the majority of OIC members. Studies on various factors influencing the Human Development Index in members of OIC have yielded mixed results. Consequently, additional study is required to close this knowledge gap and offer a more comprehensive grasp of the variables affecting the Human Development Index in OIC member nations. The findings suggest that governments need to improve access to decent jobs both in urban and rural areas, and most importantly advocate sustainable urban development along with communities and the private sector.

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## INTRODUCTION

The Organization of Islamic Cooperation (OIC) consists of more than 30% of low-income countries in the world, the World Bank reported (Fauziana and Ratnasari, 2023). The Human Development Index (HDI) has three indicators: life expectancy, educational attainment, and community income (Wibowo, 2022). The HDI component will rise in tandem with human well-being (Yusuf and Setiawan, 2022). The data from UNDP shows that it is divided into four index categories: very high, high, medium, and low, including 191 countries.

The United Arab Emirates is the only member of Organization of Islamic Cooperation (OIC) among the top 30 countries with the highest HDI worldwide for the years 2015 to2020. This is due to the fact that the average Muslim nation's Human Development Index (HDI) rankings are still low. The value and quality of human development are still below the optimum levels, notwithstanding the existence of a few wealthy Muslim states (https://www.undp.org/). Humans are mostly responsible and strive to achieve societal well-being. Human decision-making results in both prosperity and disaster. However, people can

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act to resolve and reverse the unfavorable situation stemming from poor public decision-making (Rochdi, 2009). The Human Development Index (HDI) indicates that good human development accomplishes this.

A high community well-being standards can be achieved through raising the proportion of government expenses for health and education, including better access for all members of the society. The goal of this human capital expenses is to create more competent individuals who can find respectable, well-paying jobs (Januari *et al*., 2024). Since there is a larger labor pool and more earning potential in metropolitan locations, people tend to choose to live in urban areas over rural ones. To attract and employ more highly qualified human resources, training is necessary to enhance the human development index and facilitate the realization of the community's well-being.

A few factors, including education, economic growth, poverty, and unemployment, have been the focus of previous research in exploring human development ((Januari *et al*., 2024), (Azzaki, 2021), (Mahendra, 2020), (Fauziana and Ratnasari, 2023)). However, very limited previous research mentions the role of global innovation. Several indicators, including the political environment, education, infrastructure, technology, and knowledge creation in each economy, comprise the global innovation index. These factors are crucial because a country's level of innovation can foster better prosperity and education.

The Organization of Islamic Cooperation (OIC), which consists of 57 moslem majority countries, is a cooperative among Islamic nations. OIC has obtained official registration as an internationally recognized organization. According to UNDP, low standards of living, poor health, and inadequate education can all contribute to multidimensional poverty. It demonstrates that one of the main issues facing Islamic nations is still poverty and a low standard of living. Research on the variables influencing the Human Development Index in the nations of the Islamic Cooperation Organization (OIC) has shown conflicting results, despite the fact that a number of studies have looked into this topic.

This study focuses on how employment, urban population, inflation, and the Global Innovation Index influence the Human Development Index in OIC member countries. Therefore, we believe that this study shows which variables have proven to be influential and hypothetical in improving the quality of life, protecting against poverty, and enhancing human resources in Islamic countries.

To gauge well-being, the Human Development Index is among the best alternatives. Human resources are both the process's subject and object, demonstrating that people are not just development's primary emphasis but also its ultimate objective (Kusuma and Faridatussalam, 2022). Human development is defined as "a perfect being who can make life choices for the sake of well-being". This definition highlights how important and wide-ranging human development is in everyone's life, meaning that nations can raise productivity and enhance community quality of life by making essential components of individual development more widely available ((Rahma Febriyanti, Tri Ratnasari and Wardhana, 2022), (Rahma Febriyanti, Tri Ratnasari and Wardhana, 2022)).

The fundamental method addresses the needs of planners and policymakers' objectives by establishing a specific set of goals. The primary goal of these objectives is to raise people's

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quality of life. Therefore, a benchmark for accomplishing lifelong goals might be defined as one's health, education, employment, and related income. People view work as a component that increases personal income, ensuring greater access to products and services. One of the most crucial elements of human growth is work or at least a respectable job. By expanding the Human Development Index (HDI) to include the employment component known as "human security," we can obtain a more thorough assessment of human development.

The increasing needs of the population mean they have to work harder to increase their income to survive (Mihci, Taner and Sezen, 2012). The participation of the global labor force increased over time (Barin, Kundak and Cenikli, 2020). An economy that functions on full employment opportunities and therefore has a high gross domestic product (GDP) shows a fundamental improvement in terms of human development. In other words, jobs have a positive correlation with the Human Development Index (HDI). Its production is crucial for economic growth and poverty alleviation. Improving employment standards is the primary objective of the International Labour Organization (ILO).

Rising inflation impacts the Human Development Index (HDI) by reducing buying power and exacerbating the financial circumstances of the people. According to Raysharie *et al.*, (2023), an extremely high degree of inflation might lead to economic instability and inhibit economic growth. A rise in demand relative to the supply or manufacturing capacity is the root cause of inflation. To promote economic progress, which will eventually improve people's quality of life, a steady rate of inflation is necessary. Susanto (2018) describes a scenario where a decline in inflation meets the fundamental requirements to raise the Human Development Index while having a beneficial effect on the buying power of the poorer classes (Ramada, Arif and Dev, 2019).

The urban area is rapidly growing as it is the center of economic activity, population, and economic growth in the community. A change in an economy occurs when the level of economic activity increases compared to the previous time (Sari and Setyowati, 2022). Urbanization is a development process involving a variety of multifaceted factors, such as demographic, social, economic, and geographical regions, and is characterized by the concentration of the population in urban areas (Hadijah and Sadali, 2020). The goals of sustainable development and higher levels of HDI closely link to two important aspects: urbanization and poverty eradication. The migration from the village to the city is a response to the diverse environment that offers economic opportunities. Historically, urban populations have played an important role in the process of urbanization in many countries (Murayama, 2008).

One of the main forces behind a country's success is human development, which aims to bring about positive change (Deru *et al.*, 2023). As a result, significant creativity is required to effect change. Innovation includes the launch of new goods or modifications to existing ones, the creation of business systems, the use of novel cost-cutting techniques, an understanding of the market's importance, and an increase in productivity. Innovation is the process of creating a new product, service, or procedure and bringing it to market using a specific business model, such as development or commercialization. It can take many different forms, such as innovation or change, the introduction of domestic or foreign goods, the

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adoption of new production techniques, or the utilization of fresh resources, all of which have the potential to add value to the market (Franca Obunike and Aka Udu, 2019). Most people believe that new things encourage innovation and economic growth. Smaller and newer businesses have the potential to be important forces behind the creation of jobs, fostering innovation, boosting employment, and enhancing social welfare (Bate, Wachira and Danka, 2023).

## Hypotheses Development

### Employment Impact on the Human Development Index

We must consider the quality of the human development index to gauge human attributes in a specific sector. The Human Development Index (HDI) is a tool to ensure development success and raise the quality of human resources (Statistic Indonesia, 2020). The HDI was developed to highlight that the most crucial factors for assessing a country and its progress are its people and their capabilities, rather than merely its economic growth (Lova and Aisyah, 2024). One of the most crucial components of human growth is employment, or having a decent job. As a result, the Human Development Index (HDI) includes a component of employment, known as "human security" (Mihci, Taner and Sezen, 2012), it will become more comprehensive and able to satisfy the demands of communities to enhance their quality of life. In earlier research, analysis revealed that job opportunity factors have a significant positive impact on the Human Development Index (HDI). This is because there is a clear correlation between income level and employment opportunity. As a result, when someone is successful in landing a job, he also benefits financially from that endeavor. Every year, the number of individuals striving to satisfy their needs, especially their fundamental needs through obtaining a decent job increases, whether in formal or informal sectors. While considerable number of developing countries are still grappling with unemployment issues that can hinder an individual's ability to meet their needs, leading to a decrease in the community's purchasing power (Cut, 2018).

H1: Employment has a positive impact on the Human Development Index.

### Inflation impact on the Human Development Index

Inflation is one of the economic phenomena that frequently has a negative effect on the state's finances because it reduces the purchasing power of money and necessitates the use of more money to accomplish tasks (Islam, 2022). Ultimately, this may have an impact on the standard of economic growth. live (people or a community). The population's standard of living and purchasing power are decreasing as a result of growing inflation. Estimates using panel data demonstrate that inflation factors significantly lower the human development index. Research by Hasibuan, Rujiman and Sukardi, (2020) ound a significant correlation between the Human Development Index (HDI) and poverty in Indonesia.

H2: Inflation has a negative impact on the HDI.

### Urban Population Impact on the Human Development Index

The shift to urban living has primarily been fueled by population growth and migration during the past century, and it is anticipated that this trend will continue in the upcoming decades (Koomen *et al.*, 2023). Increased economic growth in a country encourages more people to migrate (Tualaka, Seran and Andari, 2023). Cities will gain more territory from

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villages, which will increase competition and population density. In addition, the intense rivalry for high-quality jobs is enabling the workforce to acquire ever-more-advanced skills and abilities. Next, it improves skills, which raises the Human Development Index (HDI) and improves the quality of human resources even further (Cabus and Stefanik, 2019). Overall, urbanization significantly improves the Human Development Index. (HDI). One of the most important measures of urbanization for improving a nation's Human Development Index is the rise in the proportion of the population living in urban regions. Consequently, the emphasis should be on initiatives to raise the percentage of the population that lives in urban areas, even though the rate of economic development, particularly with regard to per capita income, is not a significant concern. It is imperative that we reap the benefits of urbanization and raise the Human Development Index (Tripathi, 2021).

H3: The Urban Population has a positive impact on Human Development Index

**The Global Innovation Impact on the Human Development Index**

People widely acknowledge that innovation can positively contribute to a nation's overall growth. Innovation will improve the general quality of life, health care, education, and economic growth, all of which will enhance a nation's Human Development Index (HDI). In an international competitive landscape, innovation has become a critical component of business strategy for the majority of these top research and development organizations (Ulya, 2020). In conclusion, it makes sense that a higher Global Innovation Index ranking can lead to an increase in the Human Development Index (HDI) through economic advancement and human development, even though there is no concrete data on the relationship between Indonesia's GII ranking and the HDI.

H4: The Global Innovation Index has positive impact on the Human Development Index

## METHODS

The analysis method used in this study is a regression with a balance panel model. The data was obtained from SESRIC, the World Bank, and the official web Global Innovation Index (GII). It consists of 13 member states of the Organization of Islamic Cooperation for the period 2012–2021.

**Table 1.** Operational Variables

| No | Variable | Definition | Symbol | Unit | Source |
|---|---|---|---|---|---|
| 1 | *Human Development Index* (Variable Endogen) | Number of scores from the Human Development Index from 2012 to 2021. | *HDI* | Index | WORLD BANK |
| 2 | *Employment* (Exogenous Variable) | 100% reduced by total unemployment | *EMP* | Percentage | SESRIC |
| 3 | *Inflation* (Exogenous Variable) | The inflation rate from 2021 to 2021. | *INF* | Percentage | SESRIC |
| 4 | *Urban Population* (Exogenous Variable) | The total number of villagers who migrated to the city. | *UP* | Percentage | SESRIC |
| 5 | *Global Innovation Index* (Exogenous Variable) | Total Global Innovation Index scores from 2012 to 2021. | GII | Index | GII |

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**The research model is as follows:**

$$HDI_{it} = \beta_0 + \beta_1 EMP_{it} + \beta_2 INF_{it} + \beta_3 UP_{it} + \beta_4 GII_{it} + \varepsilon_{it}$$

The Human Development Index $HDI_{it}$ in index units, the employment variable (EMP) in percent, the inflation variable (INF) in percent, the urban population variable (UP) in percent, and the Global Innovation Index (GII) in index units.

**Data Analysis Methods**

The analysis method used in this study was the model panel balance with the Chow and Hausman tests. The Chow test was conducted to determine the best model in panel regression analysis, i.e. between Pooled Least Square and Fixed Effect Model. The zero hypothesis $H_0$ states that the model suitable for panel data regression is the pooled least square, whereas the alternative hypothesis $H_1$ states that the suitable model is the fixed effect model. According to (Gujarati and Porter, 2012), the criteria for conducting the Hausman Test are based on probability. If the probability value is below the significance level of 0.05, the Fixed Effect Model (FEM) is preferred. Conversely, if the probability value exceeds the significance level of 0.05, the Random Effect Model (REM) is considered the better choice.

## RESULTS AND DISCUSSIONS

Table 2 compiles the first estimates of Fixed-Effect Models (FEM) and Random Effect Models (REM), as well as the results of model selection tests.

**Table 2.** Balanced Panel Data Regression Econometric Model - Cross Section

| Variable | Regression Coefficient | | |
|---|---|---|---|
| | PLS | FEM | REM |
| C | 166.1287 | -14.81372 | 6.385700 |
| EMP | -1.170.818 | 0.234536 | 0.222943 |
| INF | 0.011654 | -0.020157 | -0.024901 |
| UP | 0.037154 | 1.005129 | 0.697049 |
| GII | 0.147038 | 0.121944 | 0.000681 |
| R2 | 0.483825 | 0.989616 | 0.532630 |
| Adjusted R2 | 0.467307 | 0.988146 | 0.517674 |
| Statistik R2 | 29.29148 | 673.0857 | 35.61345 |
| Prob. Statistik F | 0.000000 | 0.000000 | 0.000000 |
| Selection Test Model | | | |
| (1) Chow | | | |
| Cross-section F(12, 113) = 458,6840; Prob. F(12, 113) = 0,0000 | | | |
| (2) Hausman | | | |
| Cross section random $c^2(4)$ = 45,8004; Prob. $c^2(4)$ = 0,0000 | | | |

Source: World Bank, SESRIC, and GII, processed.

**Test of Chow Examined Model Selection**

**Chow Test**

$H_0$ is rejected as Table 2 reveals that the p-value, probability, or empirical significance of F-statistics is 0.0000 (< 0.01). The Fixed Effect Model (FEM) is simply the estimated model.

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### Hausman Test

Since Table 2 shows that $X^2$ has a p-value, probability, or empirical statistical significance of 45,8004 (> 0,10), we accept H0. As a result, the estimated model is a Random Effects Model (REM). We selected the Random Effects Model (REM) as the optimal estimated model from the prior Chow and Hausman tests. Tables 2 and 3 include the full estimation results of the Random Effects Model (REM) the model.

**Table 3.** Random Effect Model (REM) Estimation Model

| | | | | |
|---|---|---|---|---|
| $\widehat{HDI_{it}}$ = 6.3857+ 0.2229 $EMP_{it}$ | - 0.0249 $INF_{it}$ | + 0.6970 $UP_{it}$ | + 0.0007 $GII_{it}$ |
| | (0,0004)* | (0,0002)* | (0,0000)* | (0,9878) |
| $R^2$ = 0.5326; $DW$ = 0.4671; $F$ = 35.6134; Prob. $F$ = 0,0000 | | | | |

Source: World Bank, SESRIC, and GII, processed. **Description**: *Significant at α = 0,01; **Significant at α = 0,05; *** Significant in α = 0,10; The statistical value t's probability is represented by the numbers in brackets.

### Test of Model Performance

### REM Estimated Model Existence Test

The hypothesis formulation is: $H_0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$ (all zero regression coefficient or no model exists); $H_A: \beta_1 \neq 0 \vee \beta_2 \neq 0 \vee \beta_3 \neq \beta_4 \neq 0$ (at least one non-zero regression coefficient or model exists). $H_0$ is accepted if the value (p-value), probability or statistical empirical significance $F > \alpha$; $H_0$ is rejected if p-value, probability or statistical significance is empirical F ≤ α. Table 3 shows that the p-value, probability or empirical significance of F-statistics is 0,0000 (< 0,01); so $H_0$ was rejected. In conclusion, the estimated REM model exists.

### Determination Coefficients ($R^2$)

The determination coefficient ($R^2$) demonstrates a strong prediction of the calculated model. In Table 3, The value of $R^2$ 0.5326 indicates that employment, inflation, urban population, and the global innovation index can account for 53.26% of the human development indicator variable. Variables, or other non-model elements, affect the remaining 46.74%.

**Table 4.** Regional Effects and Constants

| No | Country | Effect | Constants |
|---|---|---|---|
| 1 | Algeria | -2,043288 | 4,342412 |
| 2 | Bangladesh | 9,223252 | 15,608952 |
| 3 | Cameroon | -10,16859 | -3,78289 |
| 4 | Egypt | 15,65961 | 22,04531 |
| 5 | Jordan | -16,05967 | -9,67397 |
| 6 | Kyrgyz Republic | 16,13143 | 22,51713 |
| 7 | Lebanon | -12,84754 | -6,46184 |
| 8 | Morocco | -3,481191 | 2,904509 |
| 9 | Nigeria | -9,120394 | -2,734694 |
| 10 | Pakistan | 0,504845 | 6,890545 |
| 11 | Senegal | -9,291238 | -2,905538 |

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| No | Country | Effect | Constants |
|---|---|---|---|
| 12 | Tajikistan | 20,8239 | 27,2096 |
| 13 | Tunisia | 0,668879 | 7,054579 |

Source: World Bank, SESRIC, and GII, processed.

**The REM Estimated Model Independent Variable Effect underwent a validation test**

The impact validity test assesses the individual significance of the independent variables' influence.

$H_0$ test t $\beta_i$ = 0: Impact of independent variable I is not significant.

$H_A$'s βi ≠ 0: the independent variable I is significantly influenced.

$H_0$ is rejected if the p-value, probability, or empirical statistical significance is t ≤ α; it is accepted if t > α. Table 4 lists the results of the impact validity test.

**Table 5.** Validity Test Results of the Influence of Independent Variables

| Variable | Sig. t | Criteria | Influence Conclusion |
|---|---|---|---|
| *EMP* | 0,0004 | ≤ 0,01 | Significant at α = 0,01 |
| *INF* | 0,0002 | ≤ 0,01 | Significant at α = 0,01 |
| *UP* | 0,0000 | ≤ 0,01 | Significant at α = 0,01 |
| *GII* | 0,9878 | > 0,10 | Not significant |

Source: World Bank, SESRIC, and GII, processed

Based on table 5, testing the validity of the influence, it can be seen that the independent variables that have an influence on the Human Development Index (HDI) are Employment (EMP), Inflation (INF), and Urban Population (UP) variables. Meanwhile, the Global Innovation Index (GII) has no effect on the Human Development Index (HDI). The employment variable (EMP) exhibits a lin-lin connection pattern with a regression coefficient of 0.2229. This implies that for every 1% growth in employment, the Human Development Index (HDI) will rise by 0.2229 index points. In contrast, if employment declines by 1%, the HDI will drop by 0.2229 index digits.

The regression coefficient of the inflation variable (INF) is -0.0249, indicating a linear relationship pattern. This indicates that the Human Development Index (HDI) will drop by 0,0249 index digits for every 1% increase in the inflation variable. The regression coefficient for the Urban Population (UP) variable is 0.6970, indicating a linear relationship pattern. This indicates that the Human Development Index (HDI) will rise by 0.6970 index values for every 1% growth in the urban population. On the other hand, a 1% decrease in inflation will result in a 0.6970 index figure drop in the Human Development Index (HDI).

The Global Innovation Index (GII) variable has no influence on the Human Development Index (HDI), with a regression coefficient of 0,0007 and a linear relationship pattern. The analysis reveals insufficient data to support the hypothesis that global innovation, as measured by GII, influences changes in HDI. The GII regression factor is minimal or nearly nonexistent. Table 4 displays the constant value for every nation. It shows that Tajikistan has the highest constant value, 27.2096. This indicates that Tajikistan tends to have a higher Human Development Index value than other countries in relation to the influence of the

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variables Employment (EMP), Inflation (INF), Urban Population (UP), and Global Innovation Index (GII) on the Human Development Index (HDI). The Kyrgyz Republic, Egypt, and Bangladesh have the biggest constants, followed by Tajikistan. Jordan has the lowest constant value, -16.05967. Jordan often has a lower Human Development Index value than other nations when it comes to the impact of Employment (EMP), Inflation (INF), Urban Population (UP), and Global Innovation Index (GII) variables on the Human Development Index (HDI). Prior to Jordan, Nigeria, Algeria, Cameroon, Senegal, Nigeria, and Morocco had the lowest constants.

Employment, inflation, and urban population had a positive impact on the Human Development Index in 13 member nations of the Organization of Islamic Cooperation (OIC) from 2012 to 2021. During the period from 2012 to 2021, there is no correlation between the Global Innovation Index variable and the Human Development Index. Increased employment rates in OIC countries have a beneficial impact on overall economic well-being, as evidenced by the employment variable's positive impact on the Human Development Index. The findings of this investigation are consistent with those of a study by Amalia (2022) that found that employment positively impacted the Human Development Index. A higher employment rate can lead to higher household incomes and better access to basic services like health care and education. Increasing employment rates also contribute to worker productivity and skill improvements. With an increasing number of individuals employed, there is a chance to advance one's abilities via education and training, which may ultimately boost long-term productivity and economic expansion.

Inflation (INF) has a negative effect on the Human Development Index. Escalating inflation rates can generate economic ambiguity for both consumers and the business sphere. This research aligns with research conducted by. Nevertheless, according to the study conducted by Mahendra (2020). This ambiguity can impede investment and sustained economic expansion, as businesses and individuals tend to exercise greater caution in their expenditures and investments. These results show a positive influence so that if inflation in OIC countries falls it will increase the value of the Human Development Index, if the inflation rate rises it will reduce the value of the Human Development Index.

The urban population positively impacts the Human Development Index. Compared to rural areas, urban areas typically offer more economic activity and employment prospects. Growing urbanization could be a sign of a more vibrant economy, which would be good for both the general public's income and other economic factors. Ratnasari and Fauziana's (2023) study aligns with the results. A shift in the economic structure from the rural to the industrial and service sectors frequently coincides with increased urbanization. In the OIC member nations, these adjustments may result in long-term economic growth and an increase in the Human Development Index.

## CONCLUSION

The study aims to investigate the impact of employment, inflation, urban population, and the global innovation index (OIC) on the human development index of the member nations of the Islamic Cooperation Organization. A study using th e panel balance modeling approach found

that employment and urban population factors positively impact the human development index. On the other hand, inflation factors negatively impact the human development index. People will have better access to infrastructure, healthcare, and education, as well as an improved standard of living when employment levels are sufficient and metropolitan areas are developing well. Conversely, inflation stems from a decline in the population's purchasing power due to an increase in the overall cost of products and services. However, the Human Development Index is unaffected by the global innovation index. Therefore, we recommend the government to support policies that foster employment growth, including infrastructure, employment, training, and economic support measures. Prioritizing technology innovation is crucial, despite the lack of impact from global innovation. This study's weakness relates to the variable; other variables that remain constant may also affect the human reproduction index. Consequently, studies conducted during the dean's tenure might have included other elements like the degree of social unrest, economic disparity, or corruption. Furthermore, the application of primary data and the participation of additional Islamic Cooperation Organization members led to stronger generalizations.

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