



Performance Assessment of “Buy-and-Build” Strategies Applied in Digital-Driven Corporate Venturing

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Abstract. Currently, many large established companies which perform digital transformation use corporate venturing. It is the practice of directly investing corporate funds into external start-up companies. One of the strategies of such venture companies is the “buy and build” approach or using a platform company that makes sequential add-on acquisitions of smaller companies. However, there is controversial evidence that such a strategy can underperform conventional leveraged buyout (LBO) strategy and even can destroy the value of the company. Unlike LBO, a buy-and-build strategy requires careful execution and deployment of large financial and non-financial resources. There is few research that provides a comparative analysis between the mentioned strategies. Thus, the goal of this paper is to compare the performance of the buy-and-build strategy with that of LBO. Our sample included 2206 venture capital firms from nine countries in 1997-2020. Our findings indicated that the buy-and-build strategy in a cross-industrial setting outperforms LBO in terms of sales but underperforms in return of assets (ROA). Nevertheless, PE firms with an above-average reputation can count on higher sales, return on assets, and return on sales in buy and build rather than in LBO. The results of the study can be used by managers of industrial companies pursuing a corporate venturing approach to predict the performance of buy-and-build compared to that of conventional LBO.

Keywords: Buy-and-build strategies; Corporate venturing; Leveraged buyout; Performance assessment; Private equity

1. Introduction

Although the private equity (PE) market fascinates enough people currently and is associated with lucrative returns on investments, LBOs, and operational financial engineering, it has been evolving since then and has undergone many changes in what it is associated with. On the other hand, private equity is an important strategy that drives digitalization in many industries (Agus et al., 2021; Babkin et al., 2021; Godin & Terekhova, 2021). The true rise of PE in the early 1980s is primarily associated with liberation of so-called “junk bonds” through which LBOs of that time had been financed. This debt development marked the first wave of PE transactions, the LBO wave. PE firms have been

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doi: [10.14716/ijtech.v13i7.6192](https://doi.org/10.14716/ijtech.v13i7.6192)

enhancing their approach and implementing new value-creation techniques that led to whole new transaction waves with distinctive features: organic - operational and governance engineering and inorganic – buy-and-build strategy (Gompers et al., 2016; Guo et al., 2011; Kaplan & Stromberg, 2009). Started arguably in the late 2000s, the buy- and-build wave has dramatically changed the nature of PE firms' investments Yet the research on buy-and-build strategies topic cannot be categorized as elaborate and satisfactory, and still has potential (MacArthur et al., 2022).

The buy-and-build strategy assumes that a PE firm buys a firm with particular characteristics and then packs it with “add-ons”. Add-ons (or follow-ons) are usually smaller firms with financial and/or strategic characteristics allowing to realize synergies that eventually manifest in extra value for a combined firm on top of the value obtained mechanically by simple consolidation of two or more firms (Bansraj et al., 2020).

The buy-and-build strategy assumes that PE firm buys a firm with particular characteristics, those will be mentioned later in the paper, and then packs it with “add-ons”. Add-ons (or follow-ons) are usually smaller firms with financial and/or strategic characteristics allowing to realize synergies that eventually manifest in extra value for a combined firm on top of the value obtained mechanically by simple consolidation of two or more firms (Bansraj et al., 2020). The literature review indicated that the main drawback of buy-and-build approach is its relative complexity on two levels: investment and research ones. On the investment level, it can be logically concluded: the more PE firms penetrate the market with consolidation purposes via buy-and-build strategies, the fiercer the competition in the market becomes.

The relevance of the study is underpinned by the scientific novelty of three aspects considered altogether in the same research and, thus, observed in the same sample. First, the difference in the performance of the buy-and-build strategy and classic LBO. Second, the influence of cross-border and cross-industry acquisitions on performing buy-and-build strategies. Third, the effect of PE firms' reputation characteristics on the performance of the employed buy-and-build strategies.

The paper contributes to the literature in various ways: firstly, by raising the comparison of the two most popular types of strategies in the PE market. Secondly, by verifying the determinants of the performance characteristics for comparison of buy-and-build strategy with LBOs through the inclusion of extra measures of complexity. The main hypothesis is an advantage of buy-and-build strategy performance over LBO. Another three assume that such factors as cross-country, cross-industrial acquisitions, and PE firm's good reputation also lead to higher buy-and-build performance results over LBO.

2. Methods

2.1. Literature review

Researchers worldwide, in their attempts to investigate PE-backed deals, predominantly divide value and performance creation approaches into strategic and financial ones. Valkama et al. (2013) found that deals with add-on acquisitions outperformed those without in terms of internal rate of return (IRR) using a sample of 321 UK buyouts. Acharya et al. (2013) documented the out-performance of handling add-on acquisitions in terms of margin and multiple improvement for a sample of 395 Western European deals. In turn, MacArthur et al. (2022) stated that the number of LBO transactions was notably high in 2006-2007, right before the financial crisis, which corresponds to the period of low interest rates and increasingly high transaction multiple, which almost guaranteed profitable exit from LBO in a few years after the buyout (Weisbach et al., 2008). But as economic prosperity and risk appetite have shifted after these years, the number of

LBO transactions shrank, partially, as a result of debt becoming costly, and returns were insignificant (MacArthur et al., 2022). Research on buy-and-build strategy has its roots back to 2001 when Smit (2001) was one of the first to include and use the buy-and-build strategy term in his early works on real options “Strategic Investment: Real Options and Games”. The main point is that such an accelerated growth strategy might lead to the economy on scale or scope; thus, better marginality compared to a firm’s peer group (Bansraj & Smit, 2017). In turn, the buy-and-build strategy has been evolving steadily since the pre-2008 crisis without sharp spikes in activity. Buy-and-build strategies have been gradually increasing in the PE industry’s reliance on them (Hammer et al., 2021). But there is still no systematic evidence in the literature on whether this strategy is consistent with the stated goal of long-term growth. Many papers have done testing on the best way to expand (vertically or horizontally) (Bhattacharyya & Nain, 2011). Researchers agreed on significant positive effect of horizontal expansion on the profitability of a business. Their results confirm the previous findings about the deterioration of operating performance metrics right after downstream consolidation (Fee & Thomas, 2004). Later Shahrur (2005) showed that the integration costs are generally higher than the synergies realized and that the difficulties associated with new industries’ entry barriers offset potential benefits. Bake (2019) found that strategy managers focused on horizontal acquisition strategy due to its relative simplicity compared to vertical one. Some found that the expertise of a PE firm in large transactions with intention to inorganically grow a target enhances performance of the strategy (Kaplan & Schoar, 2005). Hammer et al. (2017) also found that the probability of buy-and-build strategy employment is subject to the experience and reputation of the PE sponsor. Acharya et al. (2013) found that the performance of deals initiated by large PE firms is, on average positive, after controlling for leverage and sector returns. The concave relationship between the committed capital and the fund’s performance measure, market return equivalent, confirms the findings of Kaplan and Schoar (2005).

2.2. Hypothesis

The following hypothesis was tested in the paper:

H1: Implementation of a buy-and-build strategy positively affects the performance of a PE firm’s investment

H2: Implementation of in-border buy-and-build strategy by PE firm positively affects the performance of PE firm investment

H3: Implementation of cross-industry buy-and-build strategy by PE firm positively affects the performance of PE firm investment

H4: Implementation of a buy-and-build strategy by a PE firm with a good reputation positively affects the performance of PE firm investment

2.3. The model

Panel data were analyzed as the sample consists of observations of multiple units obtained at multiple time periods. The sample contains data about a set of uniquely identifiable strategies – called “units” – performed by PE firms that are actively tracked over a period from two pre-acquisition years to the strategy-end year. The goal is to study the influence of carrying out buy-and-build strategy compared to other strategies conducted by PE firms. We applied the difference-in-differences regression model (Wooldridge, 2009).

Buy-and-build strategies are considered as treated (or initial, or observed), and the strategies artificially combined from the deals performed by PE firms, but not being buy-and-build by its nature, are named control (or artificial, or placebo). Diff-in-diff research design is usually based on comparing four groups of objects. According to the first hypothesis (H1) these groups are: the ones that received the treatment (post-treatment

treated, or buy-and-build in post-treatment years), the treated prior to the treatment (pre-treatment treated, or buy-and-build in pre-treatment years), the nontreated in the period before the treatment occurs to treated (pre-treatment nontreated, or artificial in pre-treatment years) and the nontreated in the period after the treatment is implied (post-treatment nontreated, or artificial in post-treatment years). Therefore, three of them are not affected by the treatment. Control group is not exposed to the intervention – meaning buy-and-build strategy – in any period, while the treatment group is only in post-treatment year. In this research study, treatment year is a year of strategy start – when the PE fund buys a platform firm.

All these under H1 can be formalized by introducing a regression equation:

$$Y_{s,t} = \alpha + \beta_1 Post_{s,t} + \beta_2 BB_s + \delta BB_s \cdot Post_{s,t} + (u_{s,t} + \varepsilon_{s,t}) \tag{1}$$

where $Y_{s,t}$ is an outcome variable (strategy performance); $Post_{s,t}$ is a dummy variable indicating post (= 1) and pre-treatment (= 0) years¹; BB_s is a dummy variable indicating treatment (= 1) and control (= 0) groups; $BB_s \cdot Post_{s,t}$ (composite variable or interaction term) is a dummy variable indicating whether the outcome was observed in the treatment group AND after the treatment received (= 1), or any other case (= 0); α is an unobserved time-invariant strategy characteristic; $(u_{s,t} + \varepsilon_{s,t})$ is composite error term. In all specifications, robust standard errors will be used due to the presence of heteroscedasticity. Regressions under H1 are run on the sample of buy-and-build and artificial strategies in pre-, post-, and treatment years.

The coefficient of the highest interest in the current analysis is δ , the so-called “treatment effect”. Note that diff-in-diff estimator δ is the difference of the mean differences, meaning that it reflects the *treatment effect* being the difference in the treatment group before and after the treatment, and subtracts the *trend over time* in form of the difference in the control group before and after the treatment. As δ shows a difference between groups and is constant, it implies a homogeneous treatment effect to be present. Regression is run on the sample of buy-and-build and artificial strategies in pre-treatment and post-treatment years. Note that each variable’s coefficient tests a different hypothesis (Table 1), and provides the researcher with fundamental knowledge:

Table 1 Interpretation of coefficients in the first model modification (1)

Coefficient	Variable	Hypothesis
α		H_0 : The average outcome of the control group before the treatment is zero
β_1	$Post_{s,t}$	H_0 : There is no difference between the average outcome of the control group before and after the treatment
β_2	BB_s	H_0 : There is no difference in outcome between control and treatment groups before the intervention ²
δ	$BB_s \cdot Post_{s,t}$	H_0 : The treatment effect is zero

Another categorical distinction is made based on the conduction of strategy in one country (in-border) or not (H2), performing a strategy across different industries (vertically) or not (horizontally) (H3), and PE firm has a good reputation or not (H4). With

¹ Post-treatment years ($Post_t = 1$) are from first post-treatment year ($t + 1$) to strategy-end year; $Post_t = 0$ for two pre-treatment ($t - 2$ and $t - 1$) and treatment ($t = 0$) years under assumption of possible late reflection of acquisition information in company’s financial statements

² In randomized experiments, where subjects are randomly selected into treatment and control groups, β_2 should be zero as both groups should be nearly identical; in a controlled experimental setting, as current research, it may differ

the dependent variable being strategy performance, the regression equations are specified as follows:

The model under H2:

$$Y_{s,t} = \alpha + \beta_1 \text{Country} + \beta_2 \text{BB}_s + \delta \text{BB}_s \cdot \text{Country} + (u_{s,t} + \varepsilon_{s,t}) \quad (2)$$

where *Country* is a dummy variable indicating PE fund, platform, and add-ons within one strategy being all in the same country (= 1) and otherwise (= 0);

Model under H3:

$$Y_{s,t} = \alpha + \beta_1 \text{Vertical} + \beta_2 \text{BB}_s + \delta \text{BB}_s \cdot \text{Vertical} + (u_{s,t} + \varepsilon_{s,t}) \quad (3)$$

where *Vertical* is a dummy variable indicating platform and add-ons within one strategy being in different industries (= 1) and otherwise (= 0);

Model under H4:

$$Y_{s,t} = \alpha + \beta_1 \text{Reputation} + \beta_2 \text{BB}_s + \delta \text{BB}_s \cdot \text{Reputation} + (u_{s,t} + \varepsilon_{s,t}) \quad (4)$$

where *Reputation* is a dummy variable indicating PE firm performing strategy having good reputation (= 1) and otherwise (= 0).

Regressions (2)-(4) are run on the sample of buy-and-build and artificial strategies in treatment and post-treatment years. To estimate the regression, we constructed the control group and used a matching approach. The control group is formed using matching buy-and-build strategies by year of strategy start, country, industry, and the natural logarithm of total assets), natural logarithm of sales, EBIT, ROA, ROS in the pre-treatment year. The trend in the natural logarithm of sales was tracked: before the treatment (red vertical line) treatment and control groups behave in the same way, hence it would be reasonable to assume that they would also evolve like this after the treatment in the absence of treatment (dashed blue line). The treatment effect is then represented by the difference between the orange line and the dashed blue line after strategy-start date (Figure 1).

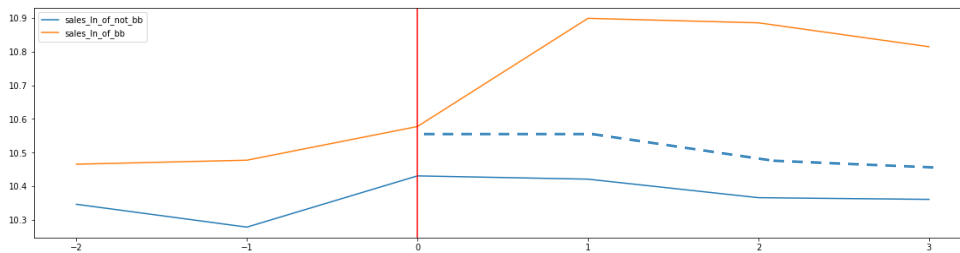


Figure 1 Parallel trends assumption tracked in LN Sales on study sample (time periods on the x-axis, LN Sales in \$000 on the y-axis)

2.4. The variables

In current research natural logarithm of sales, ROA as EBIT / Total Assets and ROS as EBITDA / Sales were used as dependent variables (Liu, 2020; Hope et al., 2013; Koufopoulos et al., 2008). Sales growth is interesting because it affects the future financial stability of the company and the growth of its assets, as well as influencing the value of a firm not only through annual free cash flow to firm/equity (FCF and FCFE), but also terminal value (TV) by firm’s intrinsic long-term growth rate. ROA, in its most popular PE research form as EBIT/Total Assets, measures the return on the use of assets to generate operating income. The evaluation is that the higher the ROA, the more effective the use of assets in the interests of shareholders. These metrics can be considered the best financial map of a company's health and an indicator of how effectively it is managed. Evaluation of the model using investment metrics has not become an aim of current research due to several reasons: (1) survivorship bias, since the enterprise value only changes after the transaction has happened; (2) a sense of PE buyouts, especially buy-and-build strategies,

an acquired company should be sold afterward if and only if the exit from the investment is justifiable (Olsen, 2003).

2.5. The data

2.5.1. Treated Sample

We used Zephyr online database to identify an initial set of deals. We also used the Orbis database to obtain financial and legal information on privately owned firms. To construct the first data set of companies being a part of buy-and-build strategies, we obtained the list of the deals from Zephyr for 1997-2020 worldwide (13849 deals). Then those without any financial records available were deleted (2206 firms were left. After data retraction, each add-on company was mapped to the respective platform and private equity firm. Then the strategies for which necessary financial data two pre-treatment, treatment and three post-treatment years were absent, were deleted from the set. Regarding the strategy longevity assumed, researchers state that the value of the company significantly enhances during the holding period, which is, on average, two to four years, and the general partner seeks to exit the strategy and capitalize on his investment. It left us with the final 41 strategies and 91 companies in them from 9 countries and 8 industries in 2010-2019 – this is the *treated* sample (Figure 2).

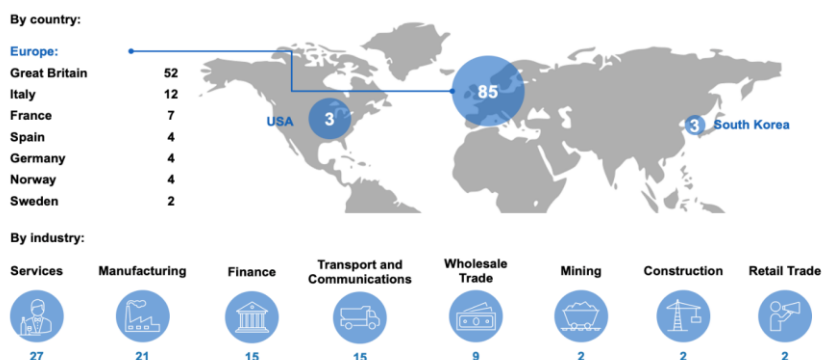


Figure 2 Distribution of companies in the treated sample by country and industry

2.5.2. Control Sample and Matching Technique

To provide diff-in-diff analysis in controlled experimental settings such as ours, one should construct a control sample providing *matching* techniques. There are different specifications that can be used to match treated and comparison units – one of them is nearest-neighbor matching. It takes each treated unit and searches for the comparison unit(s) with the closest propensity score (p-score), which is a probability of receiving treatment conditional on covariates. In our research, the related module in Python was used, which implements the k-nearest neighbors (knn) algorithm. The knn matching guarantees all treated units find a match. Due to the scarcity of the data sample, it was decided to choose one-to-one matching with replacement – meaning that each treated unit (company inside strategy) gets one matched unit, and control units can be reused and matched to multiple units. Taken literally, p-score prefers the ideal match, but in practice, it is hard to match treated to control units perfectly, so close candidates are also considered as a match. Implementation of matching with replacement shortens the p-score distance between the treated and matched unit, so the perfect pair is more possible to be found, and it also does not contradict our research design. Implementation of the one-to-one specification may increase variance in matching; however, it also reduces bias, which is considered an advantage compared to other matching techniques, such as radius matching.

The initial set of deals for the control sample is gathered from Zephyr database by the criteria: institutional buyout, management buy-in, buy-out deal type, leveraged buyout deal

subtype, and not a buy-and-build strategy. Leveraged buyout as a subtype isolates only those deals that concern the classic setting of PE investment. Next, “AND NOT buy-and-build” criterion provides additional protection against the incorrect inclusion of firms from the treated sample. After that financial data of companies was retrieved from Orbis database. The number of firms was at first equal to 9326, but after cleaning for data availability in two years before the deal date, acquisition year, and three post- years the amount equated to 295 to form a control sample. Finally, control companies were matched, which left us with control 41 strategies and 91 companies as in the treated sample.

3. Results and Discussion

Table 2 presents the empirical results of the first regression model (1) using BB, Post, and BB*Post as independent ones. The results for the natural logarithm of sales, ROA, and ROS are presented in columns (1.1)-(1.3), respectively. The main effect we are interested in is that of PE firms implying buy-and-build strategy compared to LBOs measured by $\delta BB_s \cdot Post_t$. We can see that in the model (1.1) the coefficient δ is highly significant (at 1%) and positive, meaning that there exists a positive effect of performing a buy-and-build strategy compared to LBO in terms of sales (H1 confirmed in terms of LN Sales). Moreover buy-and-build strategies annual sales are, on average, 28.73% percent higher than artificial strategies sales. The value of the determination coefficients (R-squared) is small, which is a usual phenomenon of panel data of small length. To choose between fixed effect and random effect in panel analysis, we used the Hausman test. In all our models (1-4) null hypothesis in the Hausman test failed to reject, meaning that the random effect (RE) estimator is more consistent. Additionally, for panel data, F-test is more important to confirm the dependence between dependent and independent variables. According to the F-statistic value, all three models (1.1)-(1.3) have the predictive capability: p-values are lower than 1%, meaning that the null hypothesis of all regression coefficients being equal to zero is rejected. However, the coefficient we are interested in is significant only for the model (1.1). Therefore, in our sample treatment effect of employing a buy-and-build strategy seems to not influence improvements in performance metrics ROA and ROS (H1 is confirmed for sales but did not confirm in terms of ROA, ROS). Moreover, R-squared is the highest out of three for the model (1.1) and equals 0.4991, meaning that the model explains around 50% of Ln(Sales).

As we see from Table 3, the F-test did not pass for models 2.1 and 2.3. the coefficients we are interested in are insignificant in all three modifications of model 2. Therefore, Hypothesis 2 is rejected: one cannot trace an influence of the implementation buy-and-build strategy in-border neither on the natural logarithm of sales nor on ROA and ROS compared to LBO.

Table 2 Estimation of performance metrics according to model 1

Variable	(1.1) LN Sales	(1.2) ROA	(1.3) ROS
Intercept	10.207***	0.0952***	0.0963***
BB	-0.0035	-0.0099	-0.0275
Post	0.0569	-0.0570***	-0.0550***
BB*Post	0.2873***	0.0103	0.0232
Random effect	Yes	Yes	yes
Observations	313	313	313
R-squared	0.4991	0.1509	0.1133
p-value (F-test robust)	0.0005	0.0000	0.0001

Coefficients significance: ***p-value<0.01, **p-value<0.05, *p-value<0.1

Table 3 Estimation of performance metrics according to model 2

Variable	(2.1) LN Sales	(2.2) ROA	(2.3) ROS
Intercept	10.373***	0.0294	0.0486
BB	-0.0162	-0.013	-0.0324
Country	-0.1593	0.0392	0.0147
BB*Country	0.189	-0.0113	0.0093
Random effect	yes	Yes	yes
Observations	148	148	148
R-squared	0.1908	0.0389	0.0126
p-value (F-test robust)	0.9615	0.0372	0.3954

Coefficients significance: ***p-value<0.01, **p-value<0.05, *p-value<0.1

The results of model 3 (Table 4) are controversial to what has been assumed, though there are confirmations of them in previous literature. It appeared that vertical (cross-industrial) implementation of strategy leads to lower ROA when the strategy is buy-and-build rather than LBO. Here we see that F-test is passed for all models 3.1-3.3, which is an indication of the significance of model, and we used this criterion as a core one. Nevertheless, we cannot conclude that there is a positive effect of vertical buy-and-build acquisitions compared to other strategies performed by PE funds on the natural logarithm of sales and ROS in our sample (Table 4).

Table 4 Estimation of performance metrics according to model 3

Variable	(3.1) LN Sales	(3.2) ROA	(3.3) ROS
Intercept	10.252***	0.0523***	0.0572***
BB	0.2854	-0.0129	-0.0118
Vertical	0.4237**	0.0755***	0.0269
BB*Vertical	-0.8272	-0.0855***	-0.0598
Random effect	yes	yes	yes
Observations	148	148	148
R-squared	0.1971	0.0227	0.0159
p-value (F-test robust)	0.1316	0.0000	0.0028

Coefficients significance: ***p-value<0.01, **p-value<0.05, *p-value<0.1

The most interesting conclusions are gathered from model 4 (Table 5). We got that the implementation of a buy-and-build strategy by a PE firm with a good reputation led to higher performance results both in the natural logarithm of sales, ROA, and ROS compared to widely spread LBOs. In this case, F-test -test is passed for all models 4.1-4.3, which is indication of significance of model.

Table 5 Estimation of performance metrics according to model 4

Variable	(4.1) LN Sales	(4.2) ROA	(4.3) ROS
Intercept	10.263***	0.0593***	0.0637***
BB	-0.0341	-0.0211	-0.033
Reputation	0.1421	-0.109***	-0.1494***
BB*Reputation	0.9633**	0.0891***	0.1616***
Random effect	Yes	Yes	yes
Observations	148	148	148
R-squared	0.2129	0.0345	0.0284
p-value (F-test robust)	0.0001	0.0000	0.0000

Coefficients significance: ***p-value<0.01, **p-value<0.05, *p-value<0.1

4. Conclusions

In this research, we analyze the performance metrics of buy-and-build strategies compared to that of the classic private equity-backed leveraged buyouts. It appeared that providing strategy in-border or internationally does not lead to performance advantage of buy-and-build over LBO – there is no such evidence in our sample. Vertical buy-and-build acquisitions lead to lower ROA than artificial strategy constructed from LBO targets. Lastly, private equity firm reputation matters and leads to higher sales results in buy-and-build rather than artificial LBO.

Acknowledgments

The research is partially funded by the Ministry of Science and Higher Education of the Russian Federation under the strategic academic leadership program 'Priority 2030' (Agreement 075-15-2021-1333 dated 30.09.2021).

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