



**Doctoral School of  
Management and  
Business Administration**

**THESIS COLLECTION**

**Lőrincz Noémi Szilvia**

**Value creation of the automotive manufacturing industry  
in Hungary within global value chains**

**Analyzing key suppliers**

Ph.D. dissertation

**Supervisor:**

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professor

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**Department of Strategic Management**

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## 1. Research background and relevance of the topic

Today's globalization enables international fragmentation and sharing of production. By connecting companies, employees and consumers, global value chains (GVCs) influence the structure of international trade with effects on countries' GDP levels, employment and ultimately on the global economy. With the integration in value chains, companies are able to be involved in international trade. Enterprises have the possibility to enter and also upgrade their position within GVCs, leading to a deeper integration into global trade. However, participation in GVCs also has a number of complex requirements for companies and countries as well, including the need to invest in infrastructure, institutions, services, labour, and the general trading and business environment. For many developing countries, this integration process is an important lever for intensive development.

The purpose of this thesis is to analyze how the automotive manufacturing companies being active in Hungary operate in global value chains, with a particular focus on suppliers. Although the topic of GVC is widespread and discussed in international literature, there is a gap in relation to the Hungarian automotive manufacturing industry, especially in the current situation when the COVID-19 pandemic affects the operation of the multinational enterprises (MNEs).

The main identified research question is the following: *What is the value creation of the automotive manufacturing industry in Hungary within global value chains?*

On one hand, I chose the automotive manufacturing industry as a field of research because of the fact that it is one of the leading sectors in Hungary. On the other hand, the automotive manufacturing industry is one of the most advanced industries in the world, one of the strongest competitive, global and mature industries (Gelei, 2006), from which most of the modern solutions, technologies and concepts originates. Being a network industry, the automotive industry is a good example of many features of B2B (business-to-business) transactions, especially the role of business relationships and networks. Their management is embedded in corporate operations, entails several related industries, including the transfer of knowledge and technology (Magyar – Hlédik, 2018).

This thesis contributes to the global value chain literature in a number of ways. It presents the main characteristics of the global value chains in Hungary in the automotive industry concentrating on global and local changes occurred in the recent decades, from the moment when foreign direct investment (FDI) of automotive manufacturers appeared in the country until the appearance and spreading of new technologies, like electric cars and autonomous vehicles. It also demonstrates the main challenges that automotive companies have faced in 2020 and 2021 when the COVID-19 pandemic has spread in the world and entire economies

came to a virtual standstill overnight, with a collapse both in the supply and demand side simultaneously.

The results of this research could be of great help to companies and policymakers answering questions about possible development paths and could provide a theoretical basis for measures that are necessary for an effective and beneficial participation in GVCs in the automotive manufacturing industry. Furthermore, with this comprehensive analysis of business activities of the key suppliers in the automotive industry in Hungary, the related companies can take steps to create competitive advantage and improve efficiency.

## 2. Methods used

### 2.1 Theoretical background

“GVCs today are complex networks of pre-production, production, trade and consumption” (Law, 2016). Activities in the GVCs are typically production, R&D, design, marketing, logistics, etc., which are within one firm or divided among firms. The embeddedness in GVCs are determined by the local economic, social and institutional conditions. The availability of inputs like labour, infrastructure, finance and other resources are important economic conditions; the accessibility of skilled labour and education are main social factors, while tax policies, labour regulations, subsidies are relevant institutional features.

The so called ‘*Smile curve*’ concept was originally introduced by the founder and number one leader (CEO) of Acer, Stan Shih in the 1990s in the information technology-related manufacturing industry (Baldwin et al, 2014). According to this idea, traditionally R&D, design and consumer branding activities that determine the content of a product or service are those that have a particularly high value-creating potential, so multinational companies typically hold these activities in-house, while low-value-creating activities – such as production itself – are outsourced (Gelei, 2017). However, this decision in fact is more complicated, as it is influenced by a number of other factors.

According to Gereffi and Fernandez-Stark (2016), economic upgrading means that companies, countries or regions to increase their benefits, move to activities with higher values in GVCs. The benefits of the global participation can be higher value-added, security, profit or capabilities. To be able to move up the value chain in knowledge-intensive manufacturing and services, CEE economies need to invest in R&D and innovation. The education system allows countries to have a well-educated population, which is able to serve knowledge-intensive industries, but building up clusters and collaboration between companies and research institutions, universities are required. Additional investments in the education is needed, and the needs of the key leading manufacturing and service industries should be aligned with the profiles of the universities. Local workforce should be qualified enough to be able to enter global value chains. Furthermore, a modern and effective infrastructure is also a key element of growth for companies and for GVC participation. The quality of roads, airports, the operation of transportation and transport connections determine country attractiveness for FDI. Nowadays ‘just-in-time’ delivery count as a standard firm policy, in this meaning storage and long delivery time are costly for companies (OECD, 2014).

In the automotive industry, which is in the main focus of my research, with the spread of different automation technologies, in general a *functional upgrading* process is observable from the labour-intensive to capital-intensive processes.

Since 1990, the Central and Eastern European automotive industry has been thoroughly restructured and integrated into the European automotive industry. The economic effects have been very significant as they have contributed to the economic growth, job creation and export competitiveness of the Central Eastern European economies (Pavlínek, 2020). At the same time, the economic dependency of the externally owned and externally controlled automotive industry has grown significantly. Key characteristics of the Central and Eastern European automotive industry are the following: weak development of local companies, limited upgrading opportunities and subordinate and dependent positions in the global production networks (Pavlínek, 2020). The future of the automotive industry in Central Eastern Europe depends primarily on the strategies of foreign transnational corporations in the region.

The GVC requirements are also valid in case of Hungary. In the country from 2011 the vehicle and vehicle parts production became the number one engine of the industrial production. With a share of 20% it counted as a largest sub-sector in the Hungarian processing manufacturing, ahead of computer, electronic and optical products, and the sector's share reached 30% in 2015 (KSH, 2016b). The number of employed persons rose from 85,000 to 150,000 within a few years (Madár – Szandányi, 2016). Beside the large motor and vehicle manufacturers, there is a strong network of automotive suppliers operating in the country. More than 700 companies are present in the sector as a supplier (Madár – Szandányi, 2016). The presence of the multinational automotive manufacturers has improving effects on the quality and skills of the workforce and education in the country, e.g. cooperation with universities, need for improved language skills and for higher qualifications, etc. To ensure the growth, the country needs to invest in education and training of workers and so to raise labour productivity. Supporting effects for the GVC participation for companies can be found also in governmental measures, while the poor business environment can more hinder than support Hungary's participation in global value chains. It also has economic prospering effects (GDP growth, trade balance improvement, increasing wages, etc.) and improving effects on the general company culture due to the partnerships with local suppliers (managerial skills, organizational methods, etc.). In Hungary the extent of the value-added part in the export volume is relatively small, because the share of the imported parts for the production is large. Furthermore, foreign companies are influenced strongly by the Western European headquarters.

Many European companies choose a CEE country for their manufacturing activities – e.g. German automotive manufacturers – so the near-shoring phenomenon is also present in Hungary. *Near-shoring* companies move their off-shored manufacturing activities close to their home countries, because of shorter lead times, easier way of control and cheaper labour-

and delivery costs (Stehrer et al., 2012; Stentoft, J. et al., 2015). In Europe the term is used in the context of offshoring to Central and Eastern Europe (Stehrer et al., 2012).

Based on the literature review, I formulated **two hypotheses**:

1. The theory of ‘Smile curve’ is also valid in case of the Hungarian automotive manufacturing industry, typically low value-added production processes take place in the country.
2. In addition to the central location, the cheap and skilled Hungarian labour was the most important factor in the near-shoring activities of multinational companies expanding to Hungary.

## 2.2 Survey

After revealing the most relevant theoretical findings on the topic and formulating hypotheses based on them, the research process has continued of conducting a sample survey and semi-structured interviews with the key car parts suppliers in Hungary. Executive board, managerial level and engineers were the target persons both for the survey and for interviews. The main subject of the survey and the interviews were the production processes, the core products and customers, the origin of materials, the supply processes, the purchasing policy, competitiveness strategies, the company’s local training policies, the connections with local businesses and the relationship with local institutions (e.g. universities). Moreover, the survey and the interviews also covered industry-wide aspects such as new trends in the industry, effects of the COVID-19 on the business operations, etc. Success stories about integrations into global value chains are also part of the analysis. 22 online surveys and 3 in-depth interviews have been carried out with experts of the different companies.

Data was collected from the key automotive suppliers in Hungary in order to be able to accept or reject the **first hypothesis** about the relevance of the so called ‘Smile curve’ in the Hungarian automotive manufacturing industry, to define position of the automotive manufacturer companies being active in Hungary in the global automotive manufacturing value chain and to create an in-depth understanding about investment incentives of the Western European firms in the country. The targeted automotive manufacturers are all supplier of the 5 OEMs present in the Hungary among others (Audi, BMW, Mercedes, Opel and Suzuki). During my research I contacted ca. 60 experts from the key suppliers via email, asking for consent to participate in an online survey. The survey consisted of 24 questions. The last question was about a second round, whether the person willing to participate in an in-depth interview with me.



## 2.3 In-depth interviews

To test my **second hypothesis** about the near-shoring activity in Hungary, I conducted 3 in-depth interviews with industry experts from TIER 1 companies of different size. I have chosen three experts from the participants of the online survey and contacted them via email again. I selected interviewee candidates through targeted sampling, the idea was to find extreme or deviant cases (Horvath and Mitev, 2015) of GVC participation and investment incentives, possibly finding interviewees in industry with very limited GVC governing ability and interviewees with more GVC governing capabilities and investment readiness, therefore I chose also smaller and bigger supplier companies with employees under and above 500 employees. The interviewee options to conduct the data collection is based on the industry sector and on the company as well, so it is a two-layered selection.

### *Data collection*

The data collection technique looked like as follows: firstly, I sent out a survey to supplier companies in the automotive manufacturing industry in Hungary with 24 independent questions. During the online interviews I conducted semi-structured conversations with the interviewees, including two pre-defined exercises (rating and drawing). In the form of a semi-structured in-depth interview, I prepared the list of the questions but I did not strictly follow this formalized guideline, but rather asked more open-ended questions, allowing room for a discussion with the interviewee rather than following a straightforward question and answer cycle. This way I could leave space to the study participants to offer new perspectives to the topic (Galletta, 2012). I transcribed the interviews and analyzed by categorizing along key words then collected the similar ideas and opinions said by the interviewees, compared them, and finally drew a conclusion.

This technique produces descriptive data and belongs to the qualitative research methodologies. The main incentive for this technique was that the literature for the current topic underlined studied general GVC features and FDI attractiveness of countries and lacked the first hand experience and the unique point of view of the experts from the Hungarian automotive suppliers.

### *Desk research*

Before the interviews, I have also analyzed the companies' profiles (e.g. key products and services portfolio, annual financial reports, performance reports and advisory reports) to get a better understanding about the unique situation and operation of the different firms and to have an initial impression of their role within the global value chains.

## *Interview methodology*

Firstly, I used the *narrative research* and conducted *semi-structured in-depth interviews* with the industry experts. A *narrative research* technique as a form of the qualitative research is about collecting and telling a story of the interviewees. In this type of research, the researchers write narratives about experiences of individuals, describe a life experience, and discuss the meaning of the experience with the individual (Colorado State University, 2020). The *in-depth interviews* are unstructured; a skilled interviewer asks questions from a single respondent. The goals of the conversations are to cover the motivations, beliefs, feelings of the interviewee on the topic (Shukla, 2008). Each in-depth interview lasted from 20 to 30 minutes, asking for a wide range of information and data from the past, present and future. This technique was the most suitable for my research, because there was an opportunity to ask new questions relating the previous answers. On the other hand, this technique also has some difficulties for the researcher, because the generated data is large and the unstructured feature makes interpretation difficult. Furthermore, it is a one-to-one interaction with a single respondent's opinion. Time necessity is also high in the case of the interview and the analyses (Shukla, 2008).

## *Questions*

As a first step of the interview, to get some basic information about the interviewees, I asked them to fulfil a brief questionnaire on their personal data, including their name, position, and company name. My goal was also to find experts with different work experience level. It is important because a broader range in age and work experience can bring different aspects and perspectives on GVC participation.

The first few questions of my interview concentrated on doing business in Hungary in general, including the implementation of measures taken by foreign affiliates or the HQ, the quality of the local workforce, the business environment and the governmental support. These are followed by a question about the position and upgrading path of Hungary in the automotive manufacturing GVC. The next interview question was about the key challenges of the current industry trends, and the last question was about the near-shoring phenomenon in case of the interviewee's company, where the interviewees should complete a short questionnaire about the near-shoring characteristics of their company with classifying the key near-shoring features according to relevance for their own business.

### *Rating exercise*

I sent out my questions to the respondents before the interviews, so they could see the statements about near-shoring to Hungary. The respondents ranked these words according to relevance to their operation. They separated the words firstly and formed three groups: the first group contains the statements where the respondents agree with, the second one are the neutral answers and the third group contains statements with respondents do not agree with. As a next step, interviewees started to rank the words giving a special consideration to every one of them. This technique is based on the Q-technique, but for applying the Q-technique the researcher would need 10 respondents at least.

### *Drawing exercise*

To make the interview process more diverse and interesting, I have asked my interviewees to put their companies into a 'Smile curve'. This exercise makes the interview process more unconventional and tries to reveal whether the interviewees could position their enterprises within a global value chain, and to cross-check how it appears in the minds of people involved in this research.

After completing the interviews, during the analysis of the results, bias also need to be discussed, as it impacts the validity and reliability of the study findings (Smith – Noble, 2014). Bias can also occur when we select the questions to the interviewees, so to reduce the validity threats, I tried to form my questions as neutral as possible not to influence the interviewees.

For me it was important that the interviewees and the interviewer get to know each other before the actual interview, in order to create a trusting atmosphere so that the conversation becomes as open and undisturbed as possible. Therefore, the location of the data collection would be under normal circumstances in a cosy surrounding; e.g. a Café, a quiet restaurant, or in case the participant has a stretched timeline, his / her own office would be the best place for the interview. Unfortunately, due to the COVID-19 and the restrictions, I only got to know my interviewees within the framework of an online chat.

### 3. Results of the dissertation

#### 3.1 Results of the survey

The results of the online survey deliver a comprehensive overview about the current business activities and future outlook of the most known auto parts manufacturer companies. Most of the respondents work at bigger suppliers with employees over 500 persons and they are in the TIER 1 category, typically foreign multinationals or on the stock exchange listed companies.

- According to the respondents, COVID-19 did not affect the number of employees, in general there were no redundancies. The pandemic also did not affect the production and delivery of products significantly.
- 50% of the respondents stated that when they were unable to fulfil an order, the reason have been the lack of workforce.
- The purchasing decision for the Hungarian production happens locally decisively, either independently or with involving the headquarter.
- Among the end users of the parts we can find the biggest OEMs, including those who have manufacturing plants in Hungary (Audi, BMW, Mercedes, PSA, Suzuki).
- The manufactured products are typically drive chains, body parts and electric sensors and the proportion of products designated by OEMs is rather high.
- Western Europe is the biggest export market followed by China, North-America and the Central Eastern European region.
- The respondents stated that their companies do not plan any relocation in the near future, if yes only from other country to Hungary and it is also determined by OEMs providing new opportunities for them. In some cases, wage costs and logistics also play a role in the relocation process.
- Electromobility and autonomous driving are the most affecting trends in the automotive manufacturing industry – stated the respondents.
- Except of one firm, all respondents said that they have research and development capabilities: two third of them have own R&D center and one third has it only at the head quarter of the company. It means that beside the manufacturing activities with low added value typically, also research and development activities take place at bigger multinational companies with higher added value, so I can reject the first hypothesis about the relevance of ‘Smile curve’ in the Hungarian automotive manufacturing industry.
- They also stated that favourable tax conditions and higher value added are the success criteria that will help the Hungarian automotive manufacturing industry to remain competitive in the future. Professional trainings, more support for SMEs and

favourable legal conditions are also important aspects. The key players in the automotive part manufacturing has realized that value added is a very important factor in the success of an industry and it can be increased due to investment in research and development and innovation. As revealed by the survey, they have already established R&D centers, so companies are well on their way to producing higher added value.

### **3.2 Results of the in-depth interviews**

After the **3 expert interviews** with TIER 1 supplier companies with different size in terms of employment and annual revenue, my conclusions are as follows:

- 1. Business environment:** even though the headquarters (HQ) of the three companies are settled abroad (in Germany and Canada), there is no problem in the implementation of measures taken by the HQ in the Hungarian operation in terms of employment and infrastructure. If there are any problems, they are mostly economic or cultural. All three companies cooperate with clusters or are members of associations and organizations and they also work together with universities. They consider this very useful for their business because of good business relationships and exploring business needs. Universities are essential because of research and development competencies and providing future workforce. In terms of legal environment, none of my interviewees found the amendments of the Consumer Protection Act CLV of 1997 impactful. This legislation entered into force on 22 August 2020, after which the entire supply chain can be inspected by the consumer protection authority. Probably it is the responsibility of the legal department or the companies were not inspected until the interview took place.
- 2. Value added:** the extent of the value-added part in the export volume of the Hungarian automotive manufacturing industry is relatively small historically. This can be derived from the fact that the share of the imported parts for the production is significantly large and this volume has not changed significantly in the past 5-10 years, since foreign companies are influenced strongly by the Western European headquarters. This value added part showed some improvement during the last decade, but it still takes a very low part out of the whole production value. My interviewees marked their companies on the middle of the Smile curve, especially the small suppliers. The last interviewed company, the biggest TIER 1 reports intensive research and development activities and it will be even more significant in the future, as my interviewee stated.
- 3. Near-shoring:** it plays a key role in the operation of the automotive companies being present in Hungary, due to the country's very good location in the middle of CEE with a relatively good infrastructure, cheap and skilled workforce and an optimal business

climate for foreign investors. The interviewed companies came here because of the cheap but skilled labor. Based on the interviews, the ranking of the near-shoring aspect are the following:

- skilled labor (4), (4), (4) = 12
- cheap labor (4), (4), (4) = 12
- proximity to export markets (2), (3), (2) = 7
- positive support system (3), (2), (0) = 5
- favorable tax conditions (3), (2), (0) = 5
- government policy (3), (2), (0) = 5
- proximity to HQ (0), (3), (2) = 5
- good infrastructure (0), (3), (0) = 3
- cheap raw material (0), (0), (0) (world market prices) = 0

According to the research results, I can accept the second hypothesis about near-shoring in Hungary, because beside the ‘proximity to export markets’, the cheap but skilled labor was decisive when multinationals decided to invest in Hungary. The ‘positive support system’, ‘favorable tax conditions’, ‘government policy’ and ‘proximity to HQ’ were aspect the companies used them, but they are rather neutral factors. The ‘good infrastructure’ is not so good in the real life and the ‘cheap raw material’ is not cheap, because firms have to deal with world market prices, so these were not attractive to investors.

- 4. New automobile trends:** as mobility will continue to become more digital, more connected, and especially more electric, automakers may need to reskill their current workforces. The respondents of the interviews from the two small TIER 1 companies stated that they do not have such plans yet. However, the third interviewee from the largest TIER 1 company underlined that this is the trend and the future outlook, the number of software engineers will increase relative to mechanical engineers at the company. So yes, automotive manufacturers will react to the spreading of electric, autonomous and connected cars gradually (with changes in their operations by extending or changing their production lines). However, the the scope and pace of these modifications is different at smaller suppliers and adaptation will take more time for them. My respondents have also agreed that nowadays’ digital trends are driving greater transparency in manufacturing and the components are more routinely tracked across the supply chain. In parallel to this there is a need from the OEMs’ side to have more insight into the processes of suppliers.

**5. The COVID-19:** with the spread of COVID-19, the market collapsed last year, sales volumes decreased significantly and value chains broke loose. This is linked to the semiconductor shortage, as it is also the result of the pandemic. All three interviewees confirmed that they see the semiconductor shortage as a serious downside risk. A significant proportion of their customers have cancelled their orders and the new orders are still volatile. This situation is expected to continue in the first half of 2022. Furthermore, all three agreed that in areas where possible (e.g. procurement, HR, project management, engineering) they work from home and encourage their employees taking the COVID-19 vaccine. The effects of COVID-19 are becoming less pronounced today, but the semiconductor crisis is continuing.

#### **4. Summary of conclusions**

In this research, beside laying the theoretical foundation of the GVC and the FDI inflow analysis, I conducted a survey and interviewed 3 leading stakeholders from the automotive manufacturing industry. The interviews have been conducted in a semi-structured form thus questions and topic-guideline were prepared before the interview. In terms of the research process, some limitations need to be considered: although the sample size is large enough for a qualitative study of this manner, a wider range of experts could have been added to the value of the study. Therefore, I also conducted an online survey and received 22 answers from the employees of well-known car parts manufacturers being active in Hungary. Based on the online survey and on the in-depth interviews I would summarize the value creation of the automotive manufacturing industry in Hungary as follows.

Globalization can no longer be seen as a coordinated breakdown of economic activities whose benefits are unequally distributed across geographies. It is more a strategic coexistence of value-added activities whose flexibility depends on the mutual interests of stakeholders in the value chain and across countries (Pananond et al., 2020).

Foreign direct investment is an important growth driver for Central Eastern Europe. Advanced business services are the most popular sectors for FDI in Europe, and Central Eastern Europe has extensive experience in these business areas (Skanska et al., 2016; Mattoo et al., 2004). After the economic and social transformation in the post-soviet CEE countries in 1989, enabled by the privatization processes and after the great financial crisis 2008-2009 and also as a consequence of cost-cutting initiatives, lots of multinational companies appeared in the CEE region or outsourced their business processes to developing countries. Before the crisis, the CEE expansion offered higher returns on foreign investor investment due to cheap sources, production costs, and growth opportunities.

My interviewees also underlined that foreign direct investments in the Central Eastern European auto industry have been driven by lower production costs compared to Western Europe (Pavlínek, 2020). The investment and location decisions were influenced by low wages compared to Western Europe skilled workforce, procurement of components from one source, which makes component delivery cheaper, the geographical proximity to large markets and customers, which reduces transport costs, and further investment incentives (Pavlínek, 2020). In services the motives of the initial FDI inflow have been the privatization, market seeking opportunities, cost reduction measures and outsourcing. In the industry sector the main motivations have been the cost reduction measures and the privatization (ECB, 2009). Beside significant amount of capital, new technology expertise and know-how were also brought by new investors, which helped host countries to raise productivity. Capital



inflows from new entrants have been considered as the main driver of economic restructuring and technology expansion (ECB, 2009).

Companies from advanced economies have chosen for their unskilled, labour-intensive production activities other countries with lower wages and have kept the high-value-added functions and strategic operations at home, where the necessary skilled workers have been available (Timmer et al., 2014). Beside the significant investments, Euro area countries have a large share in the external trade of the CEE countries. It means that global value chains, where CEE countries are active, have strong connection to Euro area companies (ECB, 2013a), suggesting that MNE networks are key players in global trade within GVCs, where FDI is the basic element.

The dependence on transnational corporations in terms of capital, technology, management, know-how and R&D is a fundamental structural characteristic and the greatest weakness of the FDI-driven growth of the automotive industry in Hungary. Participating GVCs in the automotive industry has improving effect on the quality and skills of the workforce and education in Hungary (cooperation between foreign multinationals and universities, language skills and higher qualifications, etc.); furthermore, on the general company culture in Hungary due to the partnerships with local suppliers (managerial skills, organizational methods, etc.). Altogether, participating GVCs in the automotive industry has prospering effects on the Hungarian economy (GDP growth, trade balance improvement, increasing averages wages etc.). However, we should note that beside improving the wage competitiveness, developing the quality of the human capital is primary to prevent the country to get stuck in the role of an “assembly workshop”. Some car brands’ success may have too much influence on the performance of the whole economy (Szabó, 2016).

All the Hungarian motorcycle and car manufacturers and a significant portion of the suppliers produce internal combustion vehicles and components. The large manufacturers in Hungary, especially Audi and Mercedes have shown some evidence of the development of electric cars, electric motors and batteries and other components in Hungary in the future. In case of parts manufacturers, the new automotive trends like electric cars, digitalization and connected cars or autonomous driving already affect the operations or will affect it within 3-5 years.

Today, the CEE region, including Hungary is a net exporter of knowledge-intensive goods. To improve its global competitiveness and to be able to move into higher-value-added goods and services, the region should invest more in R&D, infrastructure, education and collaboration between companies and universities.

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