

ECO-INNOVATIONS AS AN OPPORTUNITY FOR SUSTAINABLE DEVELOPMENT OF ENTERPRISES BASED ON THE EXAMPLE OF MAŁOPOLSKIE PROVINCE

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Purpose: The purpose of the author's research was the evaluation of activities related to eco-innovations of micro- and small-sized enterprises (MSSEs) in the Małopolskie Province.

Design/methodology/approach: The paper presents the results of the author's own surveys conducted in 2020 and 2021 based on a total sample of 524 micro- and small-sized entrepreneurs who declared their interest in taking part in the survey. The entrepreneurs answered questions regarding their companies' current operations, sources of financing and also assessed their activities in the context of eco-innovative solutions or partnerships with R&B institutions.

Findings: The paper presents the role of innovations in the process of sustainable development accounting for environmental aspects as implemented by entrepreneurs as part of investments.

Originality/value: research shows how important innovation is in the SME sector.

Keywords: innovativeness, eco-innovations, sustainable development, opportunities and barriers.

Category of the paper: Research paper.

Introduction

Currently economic development is, to a large extent, affected by the competitiveness of economy which is conditional upon, *inter alia*, innovations. Different definitions of the term "innovations" can be found in books of reference and one of the most popular ones can be found in Oslo Manual: *the implementation of a new or significantly improved product (good or service), or process, a new marketing method or a new organisational method in business practices, workplace organisation or external relations* (OECD, Eurostat, Oslo Manual, 2008). Ecological innovations or eco-innovations are a special kind of innovations that can yield

double benefits for the economy. On the one hand, they affect economic growth and, on the other, they help reduce adverse impact on the environment.

Sustainable development means building sustainable and competitive economy that efficiently relies on its resources, using, among other things, environmentally friendly methods in the process. Investing in innovations, entrepreneurs strive to use resources in a more efficient way which in a direct fashion benefits both traditional sectors of the economy and service-based economies. The implementation of modern environmental technologies has become an important challenge for contemporary economies; therefore, measures are required which aim at the rational use of the resources through, among other things, eco-innovations (Węgrzyn, 2013). Eco-innovations play a very important role in the process of minimizing the adverse impact of enterprises on their environment; they also foster entrepreneurship. The purpose of this paper is to describe activities taken by entrepreneurs in support of eco-innovations and to present advantages and disadvantages of the implementation of such activities.

1. The essence of eco-innovations

The concept of eco-innovations emerged in the 1990s when people became very broadly interested in problems related to innovations reducing environmental hazards which, in turn, led to significant growth of interest in that field among both entrepreneurs and local authorities.

The basic purpose of implementing innovations in enterprises is the desire to achieve a competitive advantage on the market. The process of constant improvement of the company management system points out to a wide scope of actions that need to be taken in order to achieve the level of competitiveness that enables occupying a strong position on the market (Grudzewski, Hejduk, 2004). It requires the application of diverse concepts, methods or manners of organizing and managing the company. Apart from the known ones, new concepts also appear, such as, for example, knowledge, innovation, technology or process management.

Such approach is the result of ecological problems which have become more and more apparent, and the search for more sustainable model of economic due to a global crisis (Szpor, Śniegocki, 2012). The concept of eco-innovations is defined in different ways and is continually improved thanks to growing recognition of a relationship between modern solutions and the natural environment.

In books of reference the concept of eco-innovations builds on of the classic theory of innovations. The implemented innovations are to ensure the enterprises' competitive advantage; however, in the case of eco-innovations, such advantage is to be achieved without compromise to or with minimal damage to the environment (Przychodzeń, 2015).

The concept of eco-innovations refers to the concept of sustainable development; that is why, among others, M. Charter and T. Clark (2001), build on that idea in their definition and use the term “sustainable innovation”. It is a process as part of which sustainable development aspects (economic, social and environmental ones) are integrated into a single system from industry, through research to implementation. Such concept can be referred to products, services and technologies as well as new ventures and organizational methods.

Table 1.
Selected definitions of eco-innovations

Author	Definition	Source
European Commission	Refers to all forms of innovations, including technical and non-technical ones, that create opportunities for enterprises and benefit the environment thanks to preventing or reducing the adverse effect on the environment or optimizing the use of natural resources	Eco-innovations, key to Europe’s future competitiveness
C. Fussler, P. James	The process of developing new products, processes or services that meet customers’ needs and the company’s values, however, with significantly reduced impact on the environment	Eco-innovation: a Breakthrough Discipline for Innovation and Sustainability
R. Kemp, A. Arundel	New and modified processes, devices, products, techniques and management systems that help avoid or reduce negative impact on the environment	Survey Indicators for Environmental Innovation
J. Carrillo-Hermosilla, P. del Río, T. Könnola	An innovation that helps improve the environment’s efficiency	Ecoinnovation. When Sustainability and Competitiveness Shake Hands
P. Klemmer, U. Lehr, et al.	Entities (companies, trade unions, associations, churches, private households) that develop new concepts, behaviors, products and processes (applied or introduced) which help reduce the environmental impact	Environmental Innovation. Incentives and Barriers
K. Rennings	The survey of entities that develop new ideas, behaviors, products and processes and help minimize the environmental impact or ecologically defined goals of sustainable development	Redefining Innovation an Eco-innovation Research and the Contribution from Ecological Economics
M. Charter, T. Clark	The process as part of which aspects of sustainable development are integrated into the company’s system from the idea/concept, through R&D and their implementation. The above refers to products, services and technologies as well as organizational models	Sustainable Innovation. The Centre for Sustainable Design
V. Oltra, M. Saint Jean	Innovations involving new or modified processes, practices, systems and products that benefit the environment and lead to environmental balance	Sectoral Systems of Environmental Innovation: an Application to the French Automotive Industry
F. Schmidt-Bleek	The development of new and competitively quoted goods, processes, systems, services and producers that can satisfy human needs and ensure living standards to all people, with the minimum use of natural resources (materials such as energy products and the surface of the Earth) per production unit and minimum emission of toxic substances	Eco-innovation, final report for sectoral innovation

Cont. table 1

D.K. Zuzek	The way of thinking and acting that sets basic development pathways related to sustainable development	The role of the sector of small-and medium-sized enterprises in the social and economic development of environmentally valuable areas in south-eastern Poland
GUS	An innovation that benefits the environment (eco-innovation) is a new or significantly improved product (a product or service), process, organizational or marketing method that benefit the environment vis-à-vis alternative solutions	Innovative activities of enterprises in 2006-2008

Source: the author's own study based on: K. Rennings, 1999, Bausteine einer Umweltinnovationstheorie und politik – neoklasische und evolutionsökonomische Perspektiven [in:] Innovation durch Umweltpolitik, Hrsg. K. Rennings, Nomos Verlagsgesellschaft, Baden-Baden [as quoted in:] M. Urbaniec, 2009, Wpływy innowacji ekologicznych na rozwój zrównoważony [in:] E. Sidorczyk-Pietraszko, Funkcjonowanie przedsiębiorstw w warunkach zrównoważonego rozwoju i gospodarki opartej na wiedzy, Wyd. WSE, Białystok; A. Pomykalski, 2001, Zarządzanie innowacjami, Wyd. Naukowe PWN, Warszawa-Łódź [as quoted in:] Ph. Kotler, S. Jatuspirak, S. Maesinee, *The marketing of nations: a strategic approach to building national wealth*, Profesjonalna Szkoła Biznesu, Kraków 1999, [as quoted in:] European Commission, Green Paper on Innovation, European Commission Supplement 5/95, 1996, Brussels, Luxembourg; European Commission, Competitiveness and Innovation Framework Programme (2007–2013), 2007, Brussels; C. Fussler, P. James, 1996, Eco-innovation: a Breakthrough Discipline for Innovation and Sustainability, Pitman Publishing, Londyn; R. Kemp, A. Arundel, 1998, Survey Indicators for Environmental Innovation. IDEA report. Step group. Oslo; K. Rennings, T. Zwick, 2003, Employment Impacts of Cleaner Production, ZEW Economic Studies, Bd. 21, Heidelberg; J. Carrillo-Hermosilla, P. del Río, T. Könnola, Eco-innovation. When Sustainability and Competitiveness Shake Hands, Palgrave, Londyn 2009; P. Klemmer, U. Lehr, et al., 1999, Environmental Innovation. Incentives and Barriers. German Ministry of Research and Technology (BMBF), Analytica-Verlag, Berlin; M. Charter, T. Clark, 2007, Sustainable Innovation. The Centre for Sustainable Design; V. Oltra, M. Saint Jean, 2009, Sectoral Systems of Environmental Innovation: an Application to the French Automotive Industry, Technological Forecasting & Social Change, No. 76; F. Schmidt-Bleek, Preface [in:] A. Reid, M. Miedzinski, Eco-innovation, final report for sectoral innovation - www.technopolis-group.com/resources/downloads/661_report_final.pdf (21-10-2008); F. Schmidt-Bleek, Preface [in:] A. Reid, M. Miedzinski, Eco-innovation, final report for sectoral innovation watch, www.technopolis-group.com/resources/downloads/661_report_final.pdf (21. 06.2019); D. K. Zuzek, 2015, Rola sektora małych i średnich przedsiębiorstw w rozwoju społeczno-gospodarczym obszarów cennych przyrodniczo w Polsce południowo-wschodniej, Stowarzyszenie Naukowe Instytut Gospodarki i Rynku, Kraków – Warszawa; GUS (2009), Działalność innowacyjna przedsiębiorstw w latach 2006-2008, Notatka Informacyjna, GUS, Departament Przemysłu, Urząd Statystyczny w Szczecinie, Szczecin.

Eco-innovations help prevent and reduce environmental pollution that results from business activities, repair damage caused and identify and monitor the level of such pollution (Hemmelskamp, 1999). Those solutions are introduced with the aim of the actual improvement of the condition of the environment rather than to avoid a given problem (Macharzina, 1999). They can be limited to those innovations that produce effects compliant with the policy of environment protection which are aimed at achieving savings in raw materials' consumption, reducing emission and contribute to reducing the risk related to human activity.

Another important issue is also reducing the use of the environment, e.g. by energy savings, reducing soil overexploitation, emission and waste. As a result, eco-innovations may produce not only environmental effects but also economic and social ones which are important aspects of sustainable development. Eco-innovations are conditional upon many interrelated factors

which vary depending on the level of development, market position or a degree of a given company's technological advancement. Pro-environmental activities taken by small- and medium-sized enterprises are characterized by their highly complex nature as they depend not only on technological and market conditions, but also on general conditions related to politics or the environment protection law. It is generally acknowledged that eco-innovations lead to the development of new processes and products being the source of value to consumers and business, yet they significantly reduce the environmental impact (Jones et al., 2001).

An important factor that affects the speed of development and quality of eco-innovations is the interest in environment protection among consumers. Thus, eco-labelling and environmental standards play an important role as they help environmentally-friendly products and production methods stand out and support environmentally aware consumers in their market decisions. Individual preferences and behavior models are equally important as social, economic and political environment and technological possibilities (Klemmer et al., 1999). It is frequently pointed out that the following factors contribute to the development of eco-innovations as regards environmental technologies (Hemmelskamp, 1999):

- technological conditions – the current state of technology, existing know-how,
- defense mechanisms – conditions of granting patents, licenses,
- the market structure and the size of the enterprise – the existing market competition forces the entrepreneurs to seek new solutions allowing to achieve a competitive advantage,
- market demand – growing interest in environmentally-friendly goods among consumers leads to entrepreneurs' growing interest in implementing eco-innovations,
- information – possible access to internal and external sources of knowledge,
- expenses – the amount of expenses entailed by, e.g., required restructuring in the case of the implementation of eco-innovations, technical and economic risk – the higher the risk of the new technology's fault rate and the higher the ROI risk, the lower the interest in eco-innovations.

2. Advantages and barriers to implementing eco-innovations

The implementation of ecological innovations produces multiple benefits. Their application helps the enterprise build its positive market image as the introduction of such innovations shows that the enterprise is aware of threats to the climate and natural environment. Eco-innovations allow companies to strengthen their competitive position and reinforce their market position (Romańczyk, 2010). The most frequent advantages that stem from the implementation of eco-innovations include:

- reducing pollution and waste,
- improving the quality of life,
- market attractiveness,
- the enterprise's profitability,
- economic stability thanks to reducing the company's dependence on prices of natural resources.

Innovations, including eco-innovations, however, encounter many barriers to their implementation which are mostly related to high costs and the society's distrust of novelties. Barriers that accompany the implementation of eco-innovations include:

- lack of market knowledge,
- lack of sufficient knowledge of business opportunities available to enterprises,
- problems related to obtaining funds for the implementation of eco-innovations,
- lack of funds and difficulties with gaining access to capital,
- high costs of eco-innovative technologies,
- absence of economic or tax incentives,
- insufficient knowledge regarding environment protection and the impact of the company's operations on the environment, as well as economic benefits of eco-innovations (currently the majority of entrepreneurs consider eco-innovations as highly expensive).

A factor being an incentive for the entrepreneurs to implement eco-innovations is benefits for the environment. They can serve as a basic goal of such innovations or result from other goals. They can also emerge at the stage of the production of a given product or service or the use of a purchased product or service by end-users. Ecological benefits are important but not the most important factor that determines the introduction of eco-innovations. Also economic benefits are vital, however, they require high investment costs which sometimes are an excessive burden for the entrepreneurs despite their environmental awareness and their desire to take environmental initiatives.

3. Characteristics of the author's own research

To determine innovations taken by MSSEs and to show the relationship between those activities and environmental activities in reference to the idea of sustainable development, empirical research was conducted the results of which are presented in this paper. The research was conducted in the Małopolskie Province in 2020 and 2021 in the form of a survey. In total, in the two periods under research, 524 surveys were conducted addressed to both micro- and small-sized entrepreneurs, covering several thematic areas. The entrepreneurs

answered questions regarding their companies' current operations, sources of financing and also assessed their activities in the context of eco-innovative solutions or partnerships with R&B institutions.

The analysis of the results obtained in the course of the research allowed to verify the activities of the enterprises in the area of innovations with a special focus on eco-innovations. The main purpose of the analysis was to verify the research hypothesis regarding low interest in eco-innovations as an element supporting sustainable development in the MSSEs in the Małopolskie Province. From among all respondents participating in the survey, approx. 32% (168 entities) accounted for innovative entrepreneurs, including 7% which were engaged in eco-innovations. As regards the entities that did not introduce innovations, the research showed that, on average, 39.5% of all respondents would like to invest in such solutions in the near future.

On average, approx. 44% of the respondents stated that their companies introduced innovative products first that were subsequently followed by new technologies or ideas for a new business (approx. 19% and approx. 15% of entrepreneurs, respectively) (Figure 1). The awareness of the existence of environmental innovations is still insufficient. Only 12% of the respondents in the years in question invested in eco-innovations, in that way contributing to improving the condition of the environment.

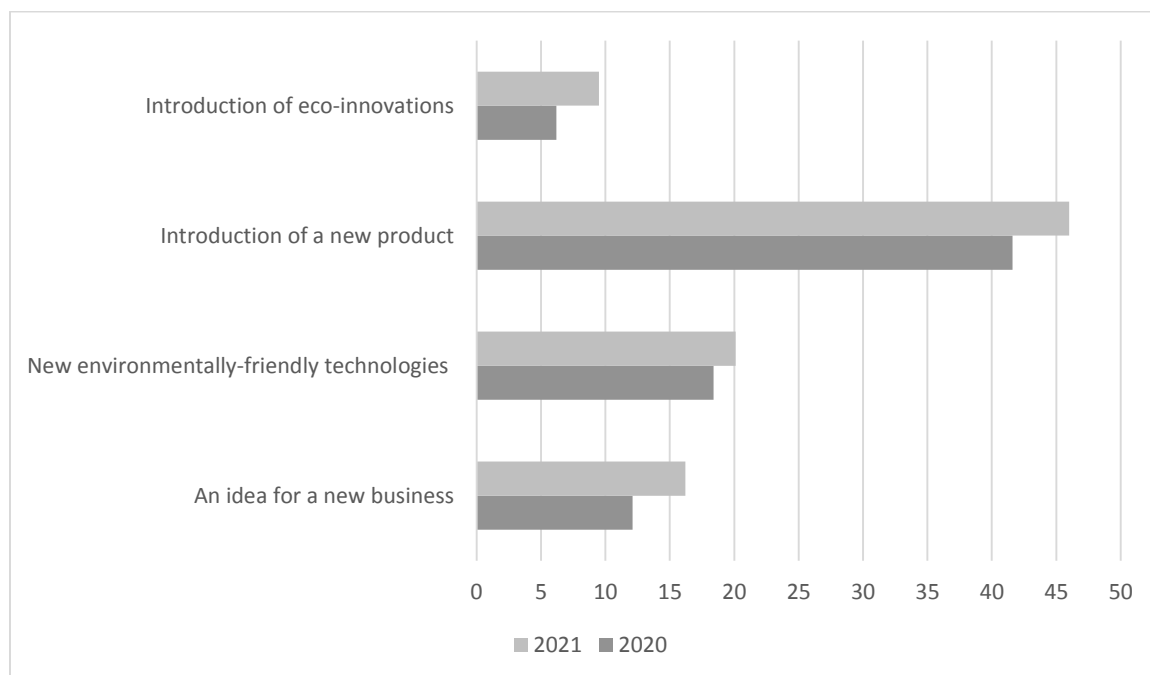


Figure 1. Introduced innovations by nature – 2020 and 2021 [%]. Source: the author's own research.

Major barriers specified by the respondents preventing them from making investment plans involving eco-innovations included insufficient financial and technical resources (on average, 36%), followed by the lack of expertise and qualified personnel (Figure 2). Also the absence of institutions that can help with the implementation of innovations was one of major features showing that such assistance is needed.

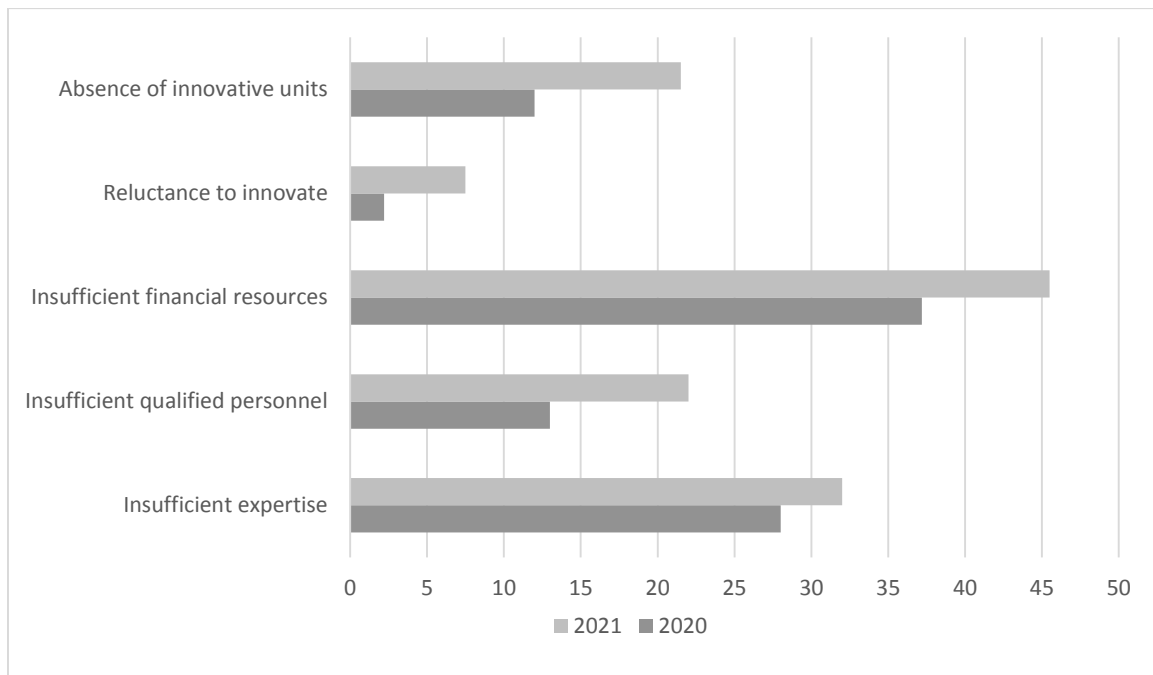
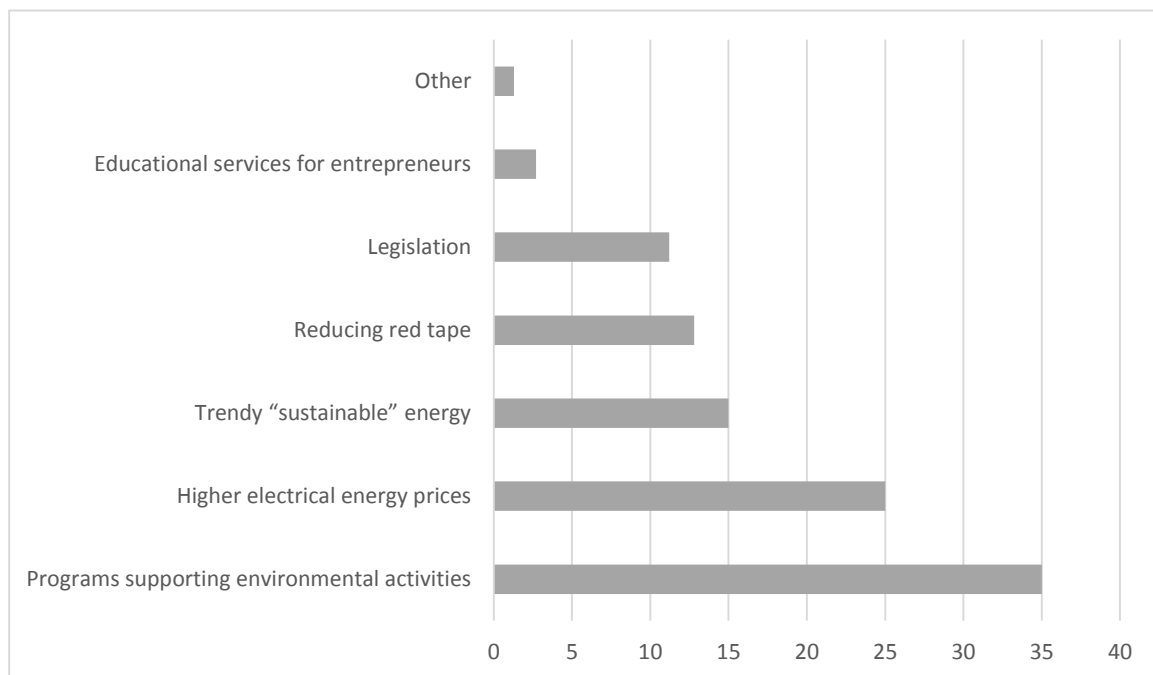


Figure 2. Barriers resulting in the entrepreneurs' reluctance to introduce eco-innovative solutions. Source: the author's own research.

Analyzing factors which encourage entrepreneurs to invest in eco-innovations, it can be observed that programs offering support in the form of subsidized investments or additional payments to “green energy” became most popular (nearly 35% of all responses). Increases in electrical energy prices (over 25%) ranked second, which were followed by trendy “sustainable” energy (approx. 15%) (Figure 3).



*values do not total 100%, more than one answer could be ticked.

Figure 3. Factors encouraging entrepreneurs to invest in eco-innovations. Source: the author's own research.

4. Summary and conclusions

The implementation of eco-innovations by entrepreneurs can yield numerous benefits that are mostly related to reducing operating costs and boosting companies' competitive advantage and, consequently, increasing their competitiveness vis-à-vis European or global economies. Measures should be taken to make entrepreneurs aware of benefits resulting from implementing the process, both for them and for the protection of the natural environment. Instruments supporting the innovations at a local or national level can become very useful in the process as they can help educate and obtain financial resources for eco-innovations. Therefore, it is crucial to have an effective pro-innovative policy in place, eliminate barriers to financing eco-innovations and continue to develop the system of supporting eco-innovations, including, among other things, engaging in activities the purpose of which is to increase environmental awareness.

1. The research conducted showed that approx. 32% of all entrepreneurs introduced innovations, including eco-innovations (approx. 7%).
2. On average, approx. 44% of the respondents stated that they introduced innovative products, 19% deployed innovative technologies (approx. 19%), and approx. 15% had ideas for a new business.
3. Major barriers specified by the respondents included: insufficient financial and technical resources (on average, 36% of respondents), or insufficient expertise and qualified staff.
4. Incentives to engaging in eco-innovations include: support programs offering subsidized investments or additional payments for "green energy" (approx. 35% of all respondents), followed by higher prices of electrical energy (over 25%), or trendy "sustainable" energy.

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