

CZECH VIDEO GAME INDUSTRY

PC, CONSOLE AND MOBILE GAME DEVELOPERS IN CZECH REPUBLIC 2020

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CZECH GAME DEVELOPERS ASSOCIATION

Czech Game Developers Association (GDACZ) brings together studios as well as individuals from game development, supports their interests, communicates with state institutions and helps the games industry in Czech Republic.

CREATIVE EUROPE MEDIA

The MEDIA sub-programme of Creative Europe supports the EU film and audiovisual industries financially in the development, distribution and promotion of their work. It helps to launch projects with a European dimension and nurtures new technologies; it enables European films and audiovisual works including feature films, television drama, documentaries and new media to find markets beyond national and European borders; it funds training and film development schemes.

KROUPAHELÁN

KROUPAHELÁN is a law firm, but don't look for classic lawyers from the 1990s. Understandable, open, perceptive and little crazy. The authors of the AAA video game, which may or may not be available at www.videogamelaw.cz. They plan to change Czech advocacy. You can find them on LinkedIn.

Authors

Pavel Barák

CHAIRMAN OF CZECH GAME DEVELOPERS ASSOCIATION

Jana Adamcová

FOUNDER OF INSTITUTE FOR DIGITAL ECONOMY

Maria Stasziewicz

DIRECTOR OF CZECH FINTECH ASSOCIATION

Jan Klesla

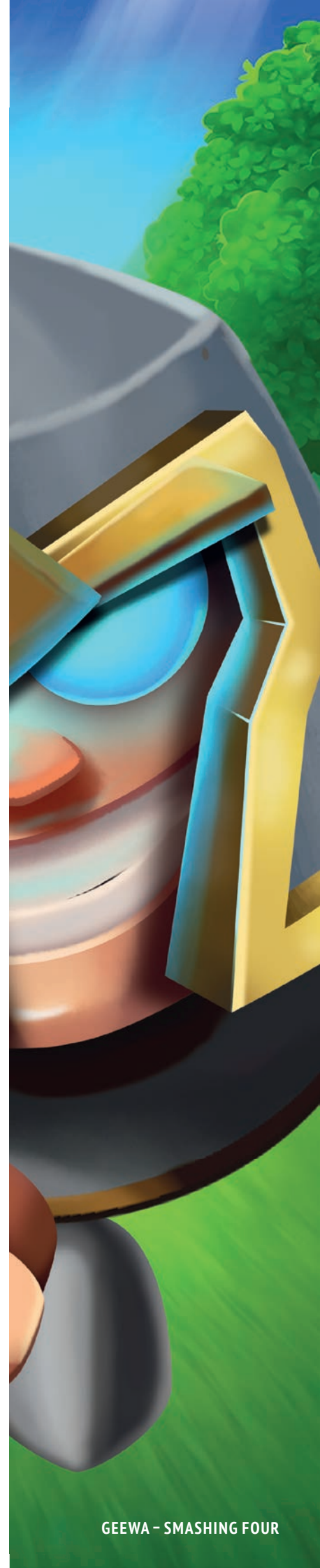
DIRECTOR OF INSTITUTE FOR DIGITAL ECONOMY

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EXECUTIVE SUMMARY

- The video games sector is dedicated to development, manufacturing and sales of specialized software that combines technology, art and business and includes products ranging from simple interactive mobile games to extensive audiovisual interactive worlds. There are **110 companies specializing in the development of video games in the Czech Republic**. A unique feature of the Czech market is strong presence of domestic companies with only 9% of game development companies being a branch of an international company.
- The game industry is now a major driver of the digital economy with digital distribution accounting for a significantly higher market share than traditional distribution. The total turnover of the Czech game industry in 2019 reached **EUR 169.4 million**, which is more than three times the turnover of Czech film production (film and television); for 2020 the total turnover **exceeding EUR 190 million** is expected.
- Video games are a business area belonging to cultural and creative industries. It shows that art, combined with the latest technology, can generate a high added value for the final products. The average **yearly growth** of this sector **reached 29% in the last five years**.
- In 2019, the number of game developers was 1,750, with more than **60% of game companies looking for more staff**.
- More than half of game development studios **employ at least one foreigner, mainly from the EU Member States**; the low proportion of foreigners from outside the European Union is due to complicated employment procedures for workers from non-EU countries.
- For start-ups, access to investors and capital is of key importance. The primary source of funding for game development is own capital – **48% of companies are 100% self-financed**, only 19% have been supported by an investment and 14% have used non-financial support (participation in trade fairs or incubation programmes).
- Czech game studios keep pace with global leaders and Czech games are becoming a strong export commodity of the Czech economy. **The average share of exports for Czech companies is 95%.**



- Despite the lack of government support in this sector, video games have made the Czech Republic famous. The main export countries or countries where games are downloaded or purchased through distribution platforms include: **USA, Germany, United Kingdom, and Russia, and China.**
- In 2019, **65 games were created in the Czech Republic.** Development of games for **PCs and consoles (67%)** continue to dominate over development for mobile platforms, which are the focus of more than a half of the studios today (41%).
- Education in the field of video games is still developing; we have identified **only a few study programmes** focused specifically on this area.
- **Systematic support for development of video games is needed** and the state should adopt a comprehensive package of measures and tools reflecting the specific needs of the sector. In particular, such package should include **visa programmes, direct and indirect support for start-ups, and long-term support for specialized education.**



STUDY PURPOSE AND OBJECTIVES

- The Czech video games industry is experiencing its best period ever. There have never been so many strong Czech companies such as Bohemia Interactive or SCS Software on the market, which is thanks to the lasting and progressively growing success of their game titles – Arma, DayZ, or Euro Truck Simulator. In addition, new players like Warhorse Studios, Beat Games, Gee-wa, and Madfinger Games have emerged, achieving outright worldwide fame. At the same time, a number of smaller studios such as Wube Software, Grip Digital, Amanita Design or About Fun have matured to the size of mid-sized businesses. Foreign players such as Wargaming or Giants have also entered the Czech market and international companies such as Ubisoft are actively interested in our country as a target for further expansion.
- All these undisputable achievements symbolized by titles such as **Kingdom Come** or Beat Saber show that the development of video games is now a full-fledged industry in the Czech Republic, which is based on what we all want for our economy – **well-paid, highly qualified experts, a combination of the latest technology with art and cultural heritage, and a product with high added value and strong export potential that spreads the reputation of the Czech Republic abroad** and helps to promote other industries and the whole country and its economy.
- The Czech game industry has **more than half a billion users** abroad, which is probably the highest number of all domestic industries. At the same time, this is achieved with relatively **modest resources which could be increased at relatively low costs and with potentially huge positive impact on the Czech economy as a whole**.
- Therefore, also the state began to pay more attention to the game sector and, in order to ensure better communication and alignment of goals, it established the **Czech Game Developers Association (GDACZ)** and supported also this study.



The primary goal of this study is **to comprehensively map the video games industry for the first time** and to describe its economic substance, importance, specifics, and benefits for the economy and the society (Chapter 2). The study is based on **own questionnaire survey conducted among game companies and it presents unique data** (Chapter 3). In particular, according to the findings from the survey, a number of recent major successes could be followed by even more success in the future if barriers are removed and the necessary public support is provided. Thus, the study describes the **sector's needs and the key factors for its further development** at a point in time that is truly ground-breaking for the industry (Chapter 4). It should clarify the needs of Czech video game developers, recommend measures for further development of this sector, and also contribute to its further consolidation.

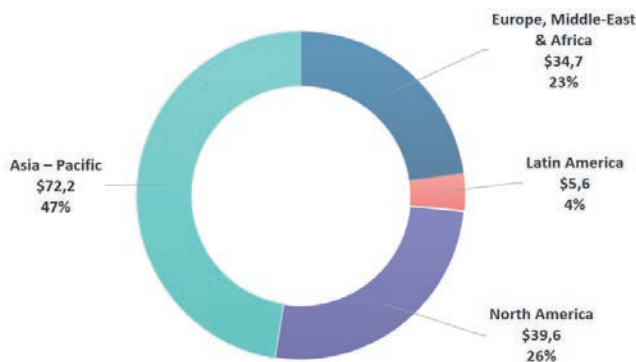
Video games share many common features with, for example, the film industry, but games generate turnover that is three times as high although the support they receive is significantly lower. This study also presents final recommendations summarizing the key findings, which will be updated on an ongoing basis (Chapter 5).



VIDEO GAMES AS AN INDUSTRY SECTOR

The video game development industry encompasses the development, production and sale of video games, which combine various technologies (in particular software development, virtual reality and artificial intelligence), art (fine art, music, animation, screenwriting, but also game design, which is unique to this industry) and marketing (marketing strategies, sales models). The industry is therefore a pioneer in technological innovation, new business models and artistic creation. Today, video games encompass a whole range of products starting from simple interactive small games for mobile phones to extensive audiovisual interactive worlds that use cinematic elements.

From the perspective of the economy as a whole, it is still a relatively new, emerging sector, which is however growing very rapidly. As it is not a purely technological industry, it occupies a growing and substantial share in the area traditionally referred to as cultural and creative industries. Its key feature is enormous customer reach – its customers are players from around the world; the game industry is usually very pro-export oriented in nature and operates globally. With a relatively small amount of resources, it achieves exceptional results, including spreading of the culture and reputation of the country of origin abroad. As these characteristics are concerned, the video game industry is now completely equal to and often even outperforms the more renowned film industry. Because of their shared characteristics, i.e. the combination of art and technology, and also due to their rapidly growing popularity, video games are often referred to as movies of the 21st century.



Global games market in 2019 per region (bln USD)



Global games market forecast toward 2023 (bln USD)

The development of a video game is a time-consuming process, which can last for several years. Start-up game companies are typically able to develop only one project at a time. This results in significant initial costs, consisting mainly of the costs of labour because tens to hundreds of developers work on the development of bigger titles. At this stage of development, the company has to rely on its own resources, incomes from other activities, loans or investments. The risk of discontinuing project development is very high.

This model can be illustrated on the development of Kingdom Come: Deliverance as an example. The development of this game started in 2011 using own resources invested by the founders of the company. Only a small team of 10 to 20 developers worked on the project at the beginning. After two years, the company completed the development of the game prototype and had to look for a publisher who would pay for the rest of the development or an investor who would enter the company and invest in further development of the game. Although these efforts were successful, the company still had to organize a crowdfunding campaign in 2014 to raise additional funds and, above all, it had to convince the investor to invest more money.

About 50 people worked on the development of the game at that stage. At the beginning of 2018, after nearly 7 years of development and with over 100 people working on the game, the project was completed. The overall development costs reached several hundred million CZK and only at this stage (if we exclude the revenues from crowdfunding and pre-sales, which are, however, only marginal in comparison to the total revenues) did the game start generating profit. However, as the game was highly successful, the costs invested were recovered within a few months after release.

2.1

Video games as part of the digital economy

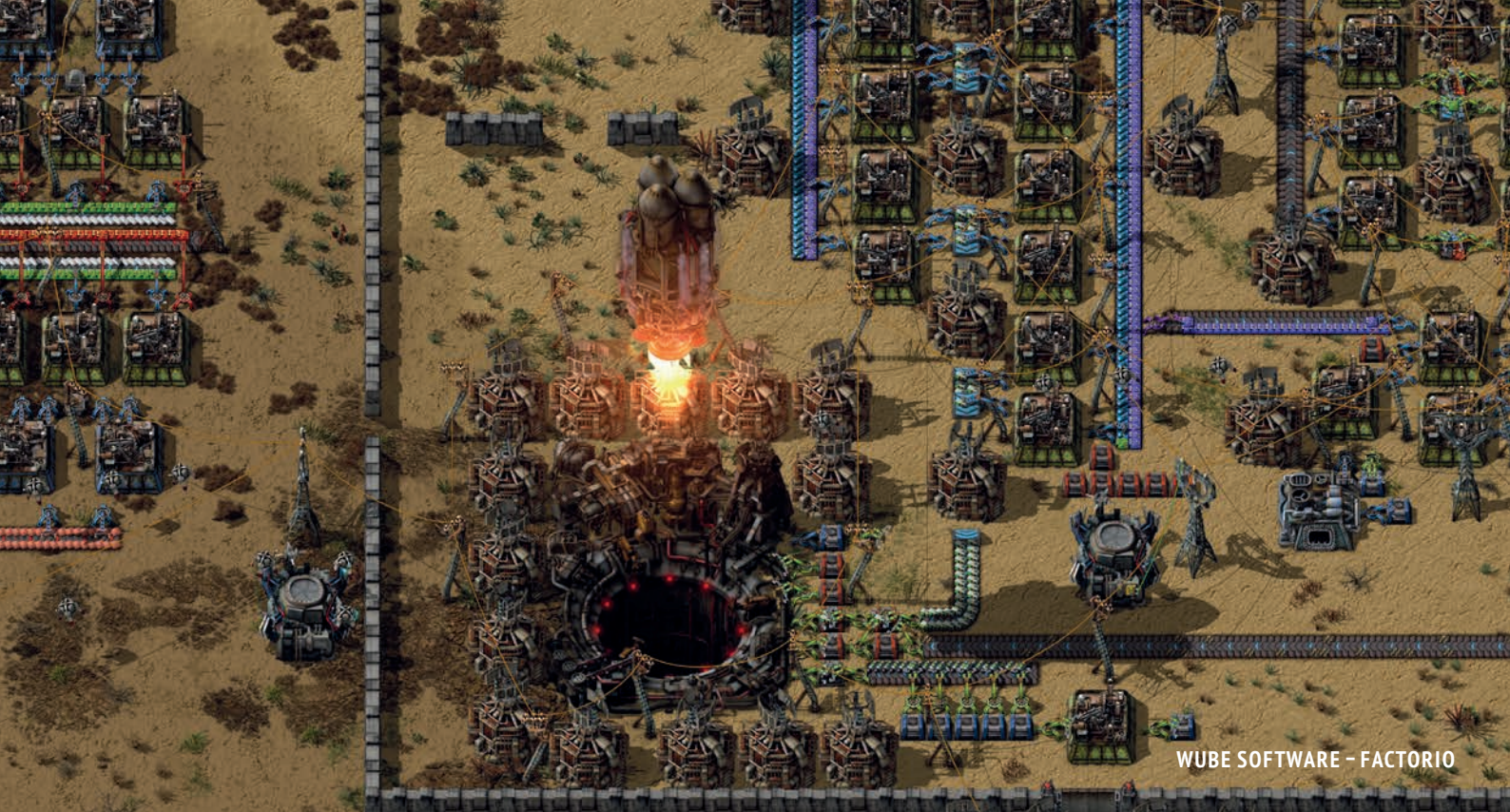
The growth of the digital economy, and especially online platforms, has fundamentally changed the business model of the game industry, both globally and in the Czech Republic. While the games released at the turn of the millennium such as *Hidden & Dangerous* (1999, Illusion Softworks/2K Czech), *Operation Flashpoint* (2001, Bohemia Interactive) and *Mafia* (2002, Illusion Softworks/2K Czech) were released only for physical distribution (boxed copy sales), the titles published ten years later, such as *Arma 2* (2009, Bohemia Interactive), *Machinarium* (2009, Amanita Design), *Mafia 2* (2010, 2K Czech), were already released both in the “boxed version” and through digital distribution. This model is still common today, but smaller titles and games developed by start-up studios are usually released only digitally as companies do not have a publisher for physical distribution and do not have sufficient know-how and resources to operate this type of distribution by themselves. Examples of such titles include *Dex* (2015, Dreadlocks), *Argo* (2017, Bohemia Interactive) and *Beat Saber* (2018, Beat Games). Mobile games, which became hugely popular after the arrival of the iPhone and the launch of the App Store in 2008, are distributed only digitally.

The retail chain, which until recently consisted of game development and the subsequent release of the game and its distribution, is transforming under the influence of these new models. Most game development studios no longer use a game publisher today, and the distribution is being replaced by digital platforms such as the Apple's App Store or Google's Play Store, or social networks (such as Facebook), or specialized game distribution platforms. The main platform for PCs is Steam.

Digital platforms reduce market entry barriers for smaller businesses (start-ups) and groups of individuals who, in addition, organize **crowdfunding** projects. However, crowdfunding can only cover a small percentage of the overall game development costs. For example, Warhorse, the company that developed *Kingdom Come*, raised around CZK 37 million at Kickstarter. A part of the sum collected was retained as a fee by Kickstarter and the total development costs reached several hundred million crowns. *Dex*, a game developed by Dreadlocks, raised over half a million CZK on Kickstarter and the development costs were several times higher. Wube Software raised over half a million CZK on IndieGoGo to develop *Factorio*. The title is still under development, but it has been available as an early-access version since 2016. The development has been going on for the fifth year with 15 dedicated developers and the total development costs have reached tens of millions of CZK by now. Yet, at the time when the crowdfunding campaign was organized, only two people worked on the game and a successful campaign was thus very important for the future of the game. If the amount had not been raised, the development would have ended.

Today, traditional publishers tend to play only the role of a marketer and game developers use them for launching some of their titles only. The model, where the publisher invests in full development of a video game, as in the case of Electronic Arts and the Swedish development studio DICE, is declining gradually, or the publisher buys the entire company and becomes its owner. Even cases when the publisher funds only part of the development costs (the final stage of development) are becoming less and less common. Electronic Arts, Square Enix, Nintendo and Sony rank among the world's top four publishers.

The role of a marketer is also taken on by traditional distribution companies, which participate also in advertising in addition to providing logistics support and access to their physical network of points of sale. These traditional distributors include local or regional companies, which physically distribute the game to end customers. There are 10 distribution companies in the Czech Republic, the biggest ones being Sony Czech, Microsoft CZ, Cenega Czech and XZone.



With the advent of digital technologies, online distribution platforms take on the role of traditional distributors covering the entire business transaction and making the digital product available virtually worldwide instantaneously. Online platforms use modern technologies to provide or mediate services or sales, or exchange goods. An essential feature of these platforms is minimization of transaction costs; without involving an online platform, the transaction would not have taken place at all, or only in a different form. The key to the use and value of a platform is its networking effect, i.e. the number of participating users, or the size of the game community. As a result, scalability is important, but also the positions of both the supply and the demand side (if both are platform-independent). Platforms for online distribution of content are one type of online platforms. By using these platforms, the developers can – exclusively or non-exclusively – distribute their digital content and reach out to a much larger target group. These platforms also bring new business models (e.g. subscriptions), become intermediaries themselves, and often also integrate vertically and participate in content creation.

For open platforms such as PCs, there are a number of online distribution platforms that developers can choose from to distribute their games, or they may decide to distribute through multiple platforms simultaneously. The main representatives of this category are Steam, Origin and GOG. For closed systems, such as game consoles or mobile devices, the distribution platform is operated directly by the system manufacturer. The biggest operators of these platforms are Sony (Playstation console), Microsoft (Xbox console), Nintendo (Switch, 3DS console) and Apple (iPhone and iPad devices and App Store as a distribution platform) or Google (Android devices with Google Play as a distribution platform).

2.2

Video games as part of cultural and creative industries

The video games industry is not only a technological field; its key added value lies in combining and connecting with other cultural industries. It is therefore a field of business belonging to cultural and creative industries and it shows how art, in combination with latest technologies, can produce **final products with high added value**. It is precisely in the cultural and creative industries where creativity, digital technologies and innovation combine giving rise to a new type of economy based on strategic use of intangible, cultural, and intellectual property rights.

Highly qualified professions, such as software developers, who are also paid well above the average wage, are needed to create the high added value for the final product⁵. In this regard, it should be added that the developer profession includes, in addition to other technical occupations such as a programmer, software analyst, script developer or technical designer, also art professions such as a graphic designer (2D and 3D, concept artist), animator, sound engineer, musician, screenwriter or director, which are common also in other art fields, and also professions such as a game designer, which is unique only to video games.

2.3

Video games as a community creator

The creation of a community and interactive links between developers and players has been historically very important for video games. Online distribution platforms have strengthened this element even further. Not only the product itself is important, but also the related services, i.e. maintaining users' interest, continually expanding the game, adding new content, providing user support, or organizing accompanying events for the game. This allows to **involve the community in product creation**. Players are no longer mere consumers; they also improve and expand the game and support the Culture 3.0 phenomenon.

An important aspect of Culture 3.0, which is apparent in video games, is that for some types of games it is important for the developers to have a community of fans, which often participates in the development of the game. Games like Operation Flashpoint, a whole series of **Arma** games developed by Bohemia Interactive, Space Engineers by Keen Software House, or Factorio by Wube software are centred on this community aspect and on involving the players as co-creators who improve and expand the game with modifications based mostly on tools and applications through which the game can be modified and more content added. Thus, players modify and expand the game and the development and use of these modifications is free. This is an example of a community authorship that is typical of the digital economy.

An element of motivation for working in the game industry is also interesting in the context of the community. Most video game professions require highly professional knowledge that can also be used in other industries. A video game server programmer can easily work on developing a banking system solution, and a graphic



designer can just as easily find a job in a marketing agency. Therefore, the demand for these skilled people is high, but some game developers prefer to stay in the game industry because they value the fun aspect and working on game development has been their “dream profession”.

Given the scarcity of human capital and the agility of game companies, it is not an exception that authors reach out to their most active community players and fans with an offer to participate in game development. This is very common especially for games where players can modify the game themselves and add their own features and content. As an example, games belonging to the Arma series developed by Bohemia Interactive can be mentioned, where many fans or modders (makers of game modifications) were subsequently hired by the company. Another example is Factorio by Wube Software, which has several foreign developers who were initially only passionate players and whom the company subsequently employed and relocated to the Czech Republic.

A similar effect is evident in students' choice of university studies, when the interest in studying technical courses is increased by the attractiveness of video games and career prospects in the game industry. With certain degree of simplification it can be said that a student who would not normally study a technical field because of the difficulty of subjects such as mathematics and informatics will be interested in a game development course even if the curriculum puts the same or even greater emphasis on mathematics and informatics precisely because of the attractiveness of games, which is particularly strengthened by the community element. It is also quite common for such motivated students to end up in a technical profession other than game development. **Thus, video games are one of the main drivers of increasing interest in technical fields and they help to train skilled professionals for other technical sectors suffering from long-term shortage of qualified people.**

2.4

Video games as an employer

The main game industry professions can be divided into two areas – technical and artistic. The technical area includes professions such as a programmer, software analyst, script developer, technical designer or tester. The artistic area includes professions such as a graphic designer (2D and 3D, concept artist), animator, sound engineer, musician, screenwriter or director, which are also common in other art fields, and then professions like a game designer, unique to video games only. A separate group consists of operating professions such as PR, marketing, HR, management, corporate management, or technical support.

Although there are also some exceptional cases of game development without the use of any technical or technological knowledge, technical professions are essential in most of the cases. Programmers, software analysts, and script developers are therefore key and they usually need to be university graduates. They write the source code of the game, which describes the basic structures governing the application's behaviour and the actual operation of the game, as well as other technologies, physical characteristics of the game environment, control of game characters or rendering (2D and 3D graphics).

In addition to this core, developers also develop other software tools for other members of the development team. The core of the game is called the game engine. Apart from nuts and bolts of the game as such, the game engine usually includes also the game editor, a programme in which individual elements of the game developed by other team members including graphics, animators or sound engineers are put together like pieces of a mosaic.

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Other professions participating in game development nowadays are similar to professions in film-making. These include screenwriters, directors, sound engineers and musicians. Since today's video games can often be compared to an interactive film and offer a full-fledged cinematic experience, the involvement of these professions is actually not surprising.

On the other hand, there are also unique professions that exist only in game development such as, for example, the game designer. The game designer defines and describes in detail the overall functionality and principles of the game as well as all the elements that the game contains and of which it will consist. The output of the game designer's work is a comprehensive manual (called the game design document) that serves all members of the development team and describes what needs to be created and how. The lead designer is usually one of the main leading roles in the team.



2.5 Video games as a pioneer of new technologies

Game developers spend considerable resources on the development and research of new technologies and innovations, which they subsequently bring to life in their simulated game worlds. Apart from developing and researching low-level concepts for image rendering and for developing the game engine itself, we can also see trends which spill over into other industries and bring game companies to collaboration with other sectors such as defence or medicine. This applies in particular to the use of artificial intelligence and virtual reality.

Artificial intelligence in the sense of a computer-controlled opponent or teammate has been part of game development since the very beginnings of video games. Today, we would call these early solutions just a decision-making algorithm that follows a fixed set of commands. Later on, machine learning algorithms began to emerge capable of responding to a variety of stimuli. Yet, advanced machine learning concepts are not very suitable for games and their use in gaming is rather sporadic.

The decision-making algorithms today are much more advanced and they dominate the entire game world and its internal rules (e.g. players, other game characters, animals, or adaptive music that dynamically changes in response to situations in the game). Nowadays, it is common for game companies to have specialized teams dedicated to research and development of artificial intelligence. The know-how that these teams develop is often useful also outside the game segment. Specifically, the Czech Republic is very strong in the field of simulations. For example, Keen Software has used its own funds and technological know-how to establish a secondary company, GoodAI, dedicated exclusively to the development of artificial intelligence. Warhorse Studios has collaborated with the Faculty of Mathematics and Physics of Charles University in developing a new generation of a solution for controlling a virtual world using a computer. Also, Bohemia Interactive is active in the field of simulations.



MADFINGER GAMES - MONZO VR

Virtual Reality (VR) is used only in some video games. A relatively small percentage of game companies focus on the development of VR games and they usually develop these only as a complement to their primary focus on PCs, consoles, or mobile devices. Globally, only less than one percent of game companies specialize exclusively in developing games for a VR platform mainly due to the high development costs, technological complexity and low potential revenues from the sale of VR games as well as the low penetration of VR devices among end-users.

Nevertheless, it should be emphasized that **the driving force behind the emergence and development of virtual reality are video games**. Similarly to artificial intelligence, game companies have also their own dedicated teams specializing in virtual reality.

Technologies developed for the game sector have potential use in other sectors, in particular:

- **educational system** – enables illustrative visualizations, attractive forms of education, supports strategy learning and teamwork;
- **health care** – games for rehabilitation, robotic operations, etc.;
- **defence and security** – voice and image recognition, simulation of real-life situations and locations;
- **transport** – training systems, simulators.

2.6 Video games as a subject of regulation

Video games are strongly regulated, primarily through the rules applied by digital distribution platforms and through self-regulation. The objective of the regulation is primarily the content of the games especially with regard to the age of the players. A universal European digital game rating system (PEGI) has been in place in Europe, Canada and Israel since 2003. It was developed by the Interactive Software Federation of Europe, is based on a code of conduct and replaced the national rating systems. In the USA, the Entertainment Software Rating Board (ESRB) fulfils this role. A sizeable fee is charged for inclusion in the system, which ranges from several hundred to several thousand dollars for placement of a single game on a single digital platform. There

is also self-regulation on distribution platforms (Apple App Store and Google Play Store), which require developers publishing games to fill out a questionnaire about game content. Games are tested through a combination of automatic and user testing.

In 2013, PEGI and the ESRB established the International Age Rating Coalition (IARC) with the aim of simplifying rating of digitally distributed games and applications. To date Australian, Brazilian and Korean authorities have joined the coalition. The coalition provides a universal online system for filling out applications through which the game publisher immediately receives a rating from all of the participants.

In terms of legal and other generally binding legal regulations, game development is most impacted by personal data protection for game users (in regard to GDPR implementation in the EU) and protection of intellectual property rights (for games as well as for online distribution), and general legal regulations. Game developers should expect more legal regulations in the near future, e.g. regulation of use of data generated by users online (ePrivacy regulation currently being developed by the European Commission). Specific regulations for introduction of artificial intelligence and other technologies are anticipated in the future.

In general, legislation applicable to game development is very complicated. Additionally, in regard to the international nature of the sector, game developers must meet requirements set forth in legal regulations on different continents, which often vary. This is problematic and above all costly, both for developers just starting out and for established game companies.

Thus, guidance by the state in how to meet legislative requirements, particularly for game export, would be a very valuable form of support. The guidance that the state provides to traditional exporters is needed by game developers just as urgently, or even more so.

2.7

Video games are not gambling

Video games are often erroneously confused with the gambling industry, i.e. with the activities of gambling machine parlours, casinos and betting shops, which are comprised of operation of gambling games, bets and lotteries and industrial production of devices which enable operation of betting games and lotteries. In the Czech Republic, this business segment is represented by the Gambling Industry Union of the CR and the Czech Chamber of Lottery Industries. This sector **is a completely different type of business**. In terms of Czech NACE classification of economic activities, the activities of gambling machine parlours, casinos and betting shops fall into Section R – Arts, entertainment and recreation, Sub-section 92 – Gambling and betting activities. These activities are likewise subject to completely different regulation, i.e. Act No. 186/2016 Coll., on gambling, which clearly defines in S. 3(1) that winning or loss is entirely or partly subject to chance or unknown circumstances.

Gambling machines and the gambling industry in general rest on the principle of betting and the potential chance of winning money. There is no such **gambling aspect in video games and this fact constitutes a significant distinction between the video game sector and the gambling industry**.

The most common business model in the video game industry is based on game users buying games as products with no further payments. However, a game user may buy game extras, but such extras are not essential to playing the entire game. In the mobile game segment, we have seen a large increase in free-to-play game models. Nonetheless, in contrast to gambling games, the key element of the mobile game business model is a service, not a product. The mobile game business model is based on maintaining users' attention through continual expansion of the given game, provision of new content, user support and events in the game rather than betting and winning money. There is generally no gambling aspect and games cannot therefore evoke analogously negative phenomena or addiction. It should be noted here that e.g. online games and games such as poker or roulette are not video games, but merely online forms of gambling.

Recently, the term “loot box” has appeared in connection to video games. A loot box is a game mechanism where the player buys additional game content that is concealed in a package that opens after his or her purchase and only then does the player learn what s/he obtained through the purchase. The player can usually tell the potential content of a package from a list that includes all of the possible content items. The package guarantees the player a minimum number of items. This principle is found in trading cards (e.g. sports – football, hockey, baseball and games – Magic the Gathering), which have been around for decades. In games (primarily mobile F2P), this element has appeared in recent years and met with extensive criticism, and is typically

mentioned in relation to gambling. However, it has never been an issue with trading cards, where the situation is identical. The biggest critics are players themselves, which often give loot box games very low ratings or do not buy them at all. As a result, game development companies are currently significantly reducing use of loot box mechanisms.

Companies developing video games take their responsibilities towards their customers, in particular children, very seriously. Every platform (PC, game console, mobile device) currently offers tools for parents to ensure that their children play games in a reasonable, responsible and safe manner.

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These **parental control mechanisms** are capable of checking limits, completely blocking online purchases, setting a maximum time limit on game playing and controlling what information can be shared with other players. Companies affiliated with the Czech Game Developers Association fully support these protective features and incorporate them into their games. These companies are aware of the need for communication with the state administration about prevention of all potential risks. If a specific regulation were under consideration, it would be necessary to identify a limit beyond which such regulation would threaten the competitiveness of game development, the most important creative sector in the Czech Republic.



VIDEO GAMES IN CZECH REPUBLIC

3.1

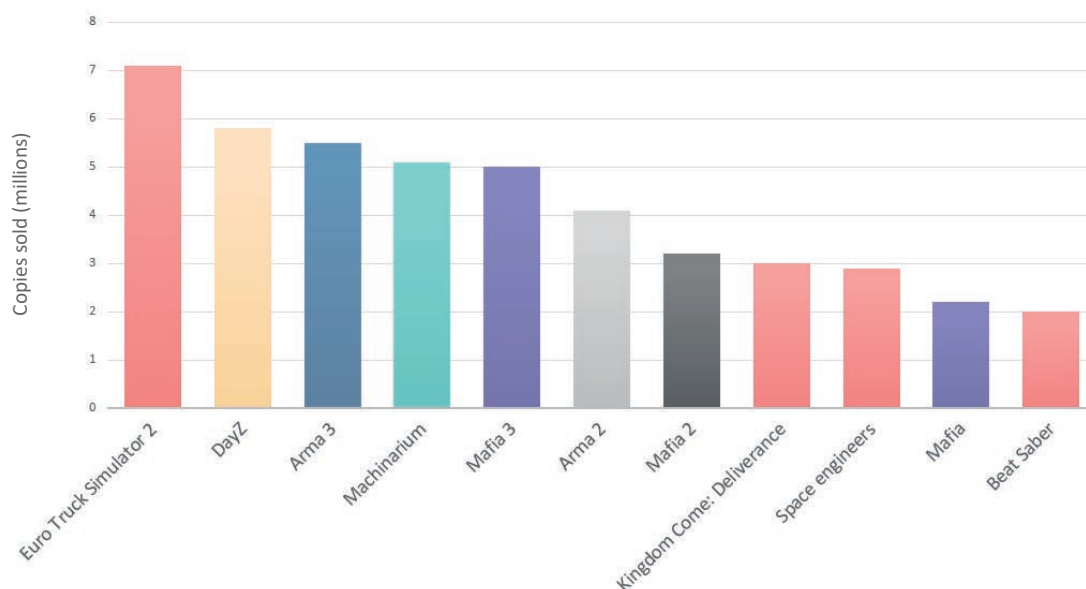
Characteristics of the Czech game industry

The Czech video game industry is based in the country's rich traditions of arts and animation. It is living proof of the critical role of content in the use of technologies, whether in the form of narratives, story lines or imagery.

The global success of Czech games began in the late 1990s with the release of the game **Hidden & Dangerous** (1999) by Illusion Softworks (subsequently bought and renamed to 2K Czech). 2K Czech went on to develop the most well-known Czech game series, **Mafia** (first edition – 2002, second edition – 2010, third edition – 2016). Other global hits include **Operation Flashpoint** (2001) by Bohemia Interactive, **Vietcong** (first edition – 2003, second edition – 2005) by Pterodon and **Samorost** (first edition – 2003, second edition – 2005, third edition – 2016) and **Machinarium** (2009), both by Amanita Design. Czech game companies keep pace with global trends and Czech games are becoming a strong export commodity of the Czech Republic. Even though this sector has lacked state support to date, video games have brought the Czech Republic much more global fame than music or film, particularly in recent years.

For example, the Czech game **Beat Saber** is currently the global leader in virtual reality games. The PC version of this game was released in mid-2018 (Oculus Rift, HTC Vive, Windows Mixed Reality), the Playstation version in November 2018 (PS VR) and the Oculus Quest version in May 2019. In March 2020 it was announced that the game reached 2 million copies sold and additional 10 million paid DLC songs sold. These numbers mean that Beat Saber achieved the **largest global sales of any VR game in history**. This game has received a number of global awards, including the title VR Game of the Year both from renowned global magazines and academics (D.I.C.E. Awards).

Over 60 million players around the world have bought Czech PC and console games sold through classic or digital distribution. We estimate that mobile games by Czech developers, where the F2P model enables the basic edition of the game to be distributed free, have reached over half a billion players worldwide. The company Madfinger Games, whose games have been downloaded by more than 200 million customers, is a leader in this field.



Video games have a very broad spectrum of uses. Aside from the entertainment industry, they are commonly used in the armed forces, healthcare industry, science and education. For example, the Czech company Lipa Learning focuses on educational and instructional games for mobile phones and tablets. The target groups for these games are children of preschool age and children in the first level of elementary school.

They teach children basic knowledge in fun ways and improve their motor skills and pre-writing preparation. Games by the company Friml have a similar focus. Some game development companies incorporate elements of Czech cultural heritage in their work and their games have a considerable cultural dimension. For example, after the number of visits to historic monuments depicted in the video game *Kingdom Come: Deliverance* increased dramatically, the Central Bohemia regional authority published a tourist guide based on the game.

Czech video games are also successful in global competitions. The 2017/2018 Central and Eastern European Game Awards included **9 nominations from Czech developers out of a total of 23 nominations** (Attentat 1942, Beat Saber, Chuchel, *Kingdom Come: Deliverance* and Under Leaves). Another big success were two game Oscar nominations at the Independent Games Festival in San Francisco (Chuchel and Attentat 1942).

The main characteristics of the computer game industry in the CZ are:

- **Constant growth.** Czech game companies are doing very well and these examples (*Kingdom Come*, *DayZ*, *Factorio*, *Beat Saber*) then draw additional potential developers into the field.
- The Czech Republic and Poland are the leaders in Central and Eastern Europe. Historically the most important creative segment was the film industry, but today **video games in the Czech Republic bring in twice as much in revenues as film**. Czech game companies make up roughly 10% of all game companies in Central and Eastern Europe, and the share of Czech developers in the total of 25,000 CEE developers is just slightly less.
- **The lack of skilled developers** is a major obstacle to further development of the industry.
- **High quality products under unfavourable conditions.** Video game development is a very strong sector that lacks solid state support. Other obstacles include the immature business environment, the low number of investors and a dependence on internal resources.



- **A mature community.** Despite the state's low level of interest in the economic, cultural and social benefits of games, there is a strong community of game developers in the Czech Republic.
 - In addition to the Czech Game Developers Association, which represents the Czech video game industry, there are many associations and community activities. They include the organization České hry ("Czech Games"), an association of Czech game designers, and the Tehdy Fund (which archives, documents and makes accessible Czech game history).
 - Sharing of information and interest in sector events are supported by printed media (Level, Score) and on-line media (Bonusweb.cz, Doupe.cz, Eurogamer.cz, Games.cz, Hrej.cz, Zing.cz) and television programming (Re-Play, Indian).
 - There are a number of sector events held annually: Game Day, Game Access, Retrip, White Nights, Gamer Pie, For Games, Game Developers Session, and Czech Game of the Year.

3.2

Economic benefits of the video game sector

The video game sector has grown continually for the past several years, although this growth is not apparent from official statistics because game development is included in the film or programming categories. Revenues in the video game sector in 2019 were over CZK 4.5 billion (EUR 169 million), which is **more than three times the revenues from Czech film production** (film and television), which was CZK 1.5 billion in 2018.

Revenues of video game companies

Czech video game companies' revenues are growing due to increasing interest in video games as well as the popularity of specific products. Thanks to the huge success of a few games the revenues were growing by 68% in 2018. In the long run the industry revenues growth by 29% each year.

2017 - CZK 2.26 billion (EUR 84.4 million)

2018 - CZK 3.79 billion (EUR 141.5 million)

2019 - CZK 4.54 billion (EUR 169.4 million)

2020 - over CZK 5 billion (over EUR 190 million)



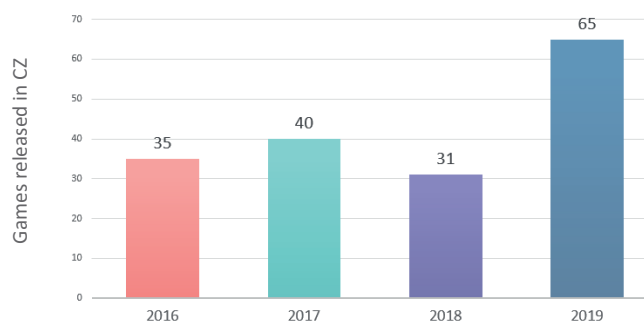
Number of games released

2016 - 35 games

2017 - 40 games (9 early access games)

2018 - 31 games (8 early access games)

2019 - 65 games (19 early access games)



The revenue growth of Czech game development companies during the past five years reflects **the global trend** of increasing demand for video games. According to estimates by Newzoo, this year 2.7 billion players will spend USD 159.3 billion globally, which is an increase **of 9.3%** compared to the previous year, i.e. USD 13.6 billion. Newzoo anticipates that similar growth will continue in upcoming years.

For comparison, in the same period, cinema ticket revenues will grow by only 6%. In general, the popularity of the game sector is the result of the increasing digitalization of the economy, the shift from text to video content, the availability of mobile phones and gamification, techniques that aim to increase client interest through use of game thinking and non-game principles (such as healthy lifestyles or finances). Video games also lead to new economic activities such as e.g. game tournaments and championships, and help adjacent sectors that produce accessory services or products (e.g. toys). They also overlap into traditional cultural sectors, e.g. the film philharmonic in the Rudolfinum Dvořák Hall in Prague has already performed game melodies through the GAMES programme twice.

3.3

Global position of the Czech game industry

The Czech Republic ranks third in the Central and Eastern European region behind Poland (EUR 265 million) and Romania (EUR 156 million). In comparison, neighbouring Slovakia achieved revenues of EUR 51 million in 2019.

Comparing all of Europe, the top four game revenue countries include Nordic countries (Finland with EUR 2.36 billion and Sweden with EUR 1.33 billion), where the game industry is highly developed, and large states with strong, mature economies (Great Britain with EUR 1.49 billion, France with EUR 1.1 billion). Finland's very strong position is partially due to the presence of Nokia, which at the time of its greatest growth focused both on development of hardware (mobile phones) and on software for their devices. The strength of the Nokia brand also attracted many investors and developers from around the world to Finland. During Nokia's subsequent decline a number of smaller companies emerged which were focused on the mobile sector, including game development. Examples include Rovio (Angry Birds) and Supercell (Clash of Clans), which generate revenues in the billions. In Sweden the game Minecraft, which became a global phenomenon, was developed by the company Mojang, whose revenues have been in the hundreds of millions of euros for several years running. Minecraft is often compared to Lego, which is from Denmark, however.

It is apparent that in the two Nordic countries, both of which are smaller than the CZ in terms of population, game industry revenues are exponentially higher. The game industry in these countries is strong, well developed and heavily supported; in recent years, however, it has stagnated and remained at the same level.

In contrast, Eastern countries including the Czech Republic show constant growth and their growth ceiling may be at the level of the Nordic countries. The economic strength of the Czech video game sector is also evident in its **"degree of independence"** (i.e. the relationship between own revenues charged and total expenses), which is 174.5% for video game development **compared to the average of 88.6%.**



In other words, the economic impact of a small sector with low labour costs is greater than that of some traditional creative industries such as film, which obtained CZK 397 million from the State Cinematography Fund for support of cinematography projects and CZK 800 million for film incentives in 2017 alone. Another interesting aspect that a comparison of the game and film industries reveals is the ratio of Czech to foreign production. The share of Czech production in film is only 24% (CZK 1.522 billion) and foreign film production in the CZ is thus equal to 76% (CZK 4.926 billion), owing to the high level of film incentive support (CZK 800 million per year). The ratio in the game industry, meanwhile, is the complete opposite, where Czech game production equals 91% and foreign production just 9% of all game development in the CZ.

This raises questions about the purpose of state incentives and the value such incentives are intended to generate. State support should primarily be allocated to development of cultural production in the CZ, but unfortunately, the majority of such support is currently directed towards production of foreign films or series, which are filmed in the CZ and employ Czechs in the production process, but do not add any cultural value to the CZ. Unfortunately, despite the growing global importance of the entire industry, robust national indicators and success on international markets, Czech game developers face several other obstacles that hinder development of the sector.

3.4

Game developers in the Czech Republic

There are approximately 150 companies in the Czech Republic that work in or are associated with game development, including developers, publishers, distributors and outsourcing firms. The exact number of game companies is difficult to identify for several reasons. Start-up development teams typically do not establish their own companies; rather, they tend to work in collaborative groups as self-employed developers. Additionally, until they launch their game on the market, which may take several years in regard to the long development process, these developers concurrently work on other jobs and do not list video game production as their main activity for statistical purposes. Czech Game Developers Association currently identifies **110 entities**, which meet the definition of active companies whose main activity is game development.

The number of people working in game development in the Czech Republic in 2019 was **1,750 individuals**, most of whom are male (87%). Demand for skilled workers outweighs the labour market supply and the lack of high-quality labour is currently the largest challenge faced by this growing sector. **Over 60% of Czech game development companies face a labour shortage and are looking for at least one new employee.** The most sought-after professions include Programmers – 28%, Artists – 27%, Level designer – 14%, Game designers – 7%, Quality assurance – 7%, Animators – 5% and other professions (musicians, sound designers, producers, PR/marketing, technical support, etc.) – 12%.

In absolute numbers, game companies currently lack **150 employees** and they are planning to open additional 300 new jobs during 2020. According to our estimates however, the existing educational system only generates **a few dozen graduates** with the skill set required by the game industry each year.

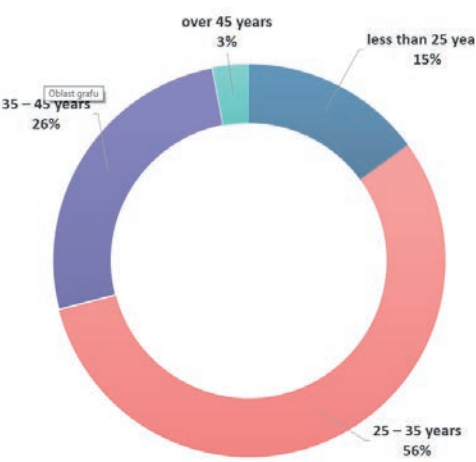
Game companies attempt to resolve the labour shortage by employing foreigners. **More than half of Czech development firms employ at least one foreigner** and the total number of foreign employees in Czech game companies equals 29%. The largest group (over 20%) of foreign employees are Slovaks. Other groups (up to 5%) are from Russia, Great Britain, the USA, Ukraine, Poland and the Netherlands.

The low share of foreigners from outside the EU is due to the complicated employment procedures for workers from non-EU countries. The administrative burden associated with “importing” workers from non-EU states and the length of the process discourage companies from considering non-EU candidates in the early stages of the selection process, which reduces the number of suitable candidates for some key positions to almost zero.

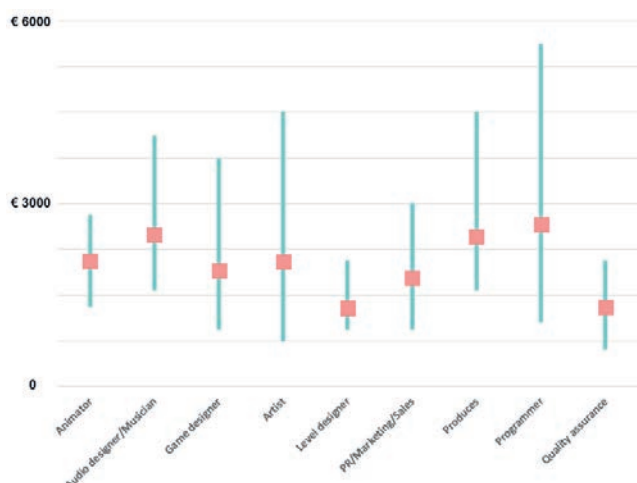
Salaries in the gaming industry are significantly above Czech average. The average salary of all game development professions is at 80% of the Czech average. However, the variance in salaries in individual professions can be significant. The applicant's seniority and overall work experience play an important role.



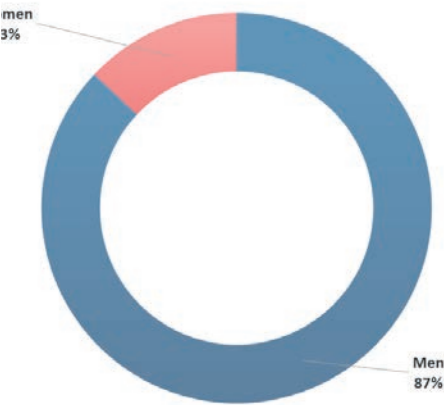
AMANITA DESIGN - SAMOROST 3



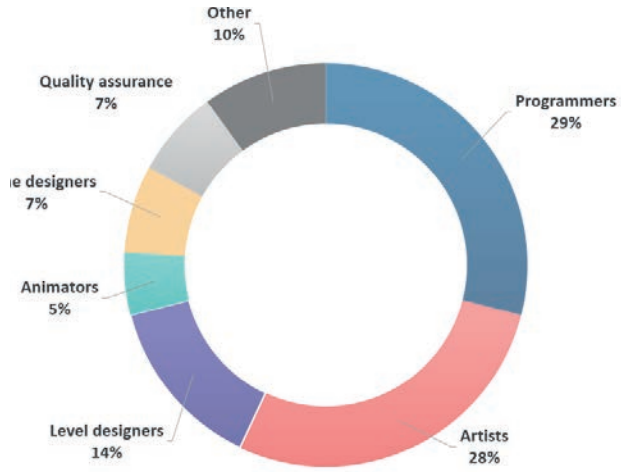
Age diversity



Salary distribution (min, max, average)



Men x Women



Current demand for new employees in Czech companies

3.5

Financing video game development

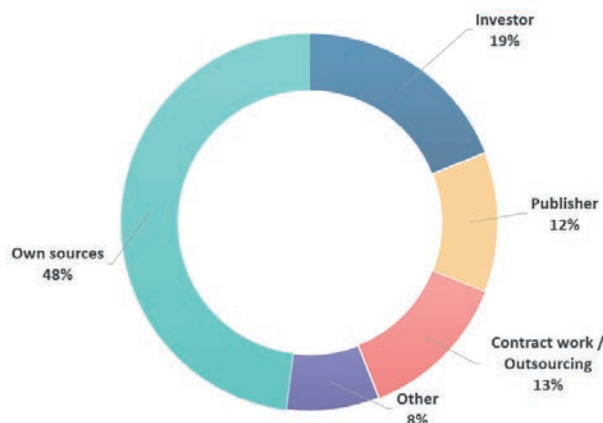
A second key factor hindering development and competitiveness in the Czech video game sector is insufficient financing. A specific characteristic of the game industry is the long game development process, which is reflected in its profit/loss and tends to occupy the entire team in most Czech firms (as described in Chapter 2.1). Moreover, game development companies receive game sales revenues mainly in the first year after a game's release, which forces them to look for other sources of income such as outsourced development. This characteristic of the economic cycle also affects a company's chances of obtaining a bank loan; only a negligible percentage of the monitored companies had received a bank loan. Nor are video games popular among Czech investors. Only one-fourth of the companies monitored had received support from Czech investors for

Sources of financing

- 48% companies is 100% financed by their own sources (private savings, family and friends)
- 19% companies received an investments
- 13% companies do contract work
- 12% companies do have a publishing company
- 14% received some public funding

Developers occasionally try to secure missing financing through alternative channels such as crowdfunding, which was mentioned above.

But these sources serve merely as auxiliary funding avenues that are never sufficient to provide the majority of the funding required for development. They are also very costly. Other alternative sources of financing include subsidies for participation in trade fairs and incubator programmes, which unfortunately are not very accessible, particularly for companies in Prague. In sum, the primary source of finances for game production are development companies' own resources, derived from savings or other business.



3.6

Export of video games

The low level of investor interest and almost complete lack of state support are even more surprising given that video games are a global product owing to their digital nature and distribution channels and weaker dependency on language and cultural context. As a result, the share of export in most Czech companies ranges from 90–99%. One exception is comprised of several small companies that publish or develop mobile and PC games (Czech Games Edition, Notre Game) to go with tangible games (card and board games) that are mainly intended for the Czech and Slovak markets (Allodium), or do outsourced development. The key export countries or countries where games are downloaded or purchased through distribution platforms are:

- The USA, which is currently the second largest video game market with revenues of USD 31.5 billion (Newzoo, 2018) and takes a 35% share of Czech exports
- Germany, the fifth largest market, where revenues were USD 4.9 billion in 2018 (Newzoo, 2018), takes a 15% share of Czech exports
- Great Britain, the sixth largest market, and Russia, 11th in the global ranking, each with a share of 10% of Czech exports

The Asian markets are currently the most interesting in terms of purchasing power. The largest Asian market is China with annual revenues of USD 34.5 billion, followed by Japan (USD 17.7 billion), which is also the third largest game market globally, and South Korea with annual revenues of USD 5.7 billion. Market entry in these countries is connected to unfavourable export conditions including censorship, protectionist policies and strict content regulation. As a result, only a few Czech companies have entered these markets, and have done so through a loyal partner, as seen in the case of Bohemia Interactive, which was addressed by the Chinese company Tencent.

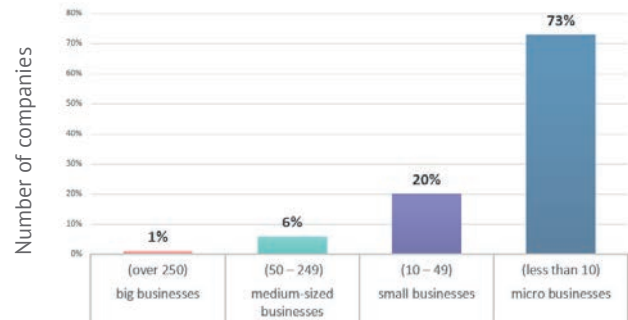
3.7

Structure of Czech development companies

The video game industry's focus on exports means that Czech companies must succeed against foreign competitors, which are often supported by their own state governments. State support is even more critical to the strengthening of the Czech game industry because most Czech companies are small or micro firms. There are only a few mid-sized development companies in the CZ and only one large business with more than 250 employees.

Company size

- 1% companies are big businesses (over 250 employees)
- 6% companies are medium-sized businesses (50–249 employees)
- 20% companies are small businesses (10–49 employees)
- 73% companies are micro businesses (less than 10 employees)



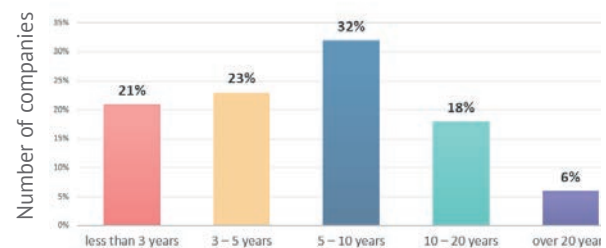
Czech companies by size

The size of Czech companies is influenced by the lack of labour and financing and other factors. The existing structure of the game industry is also the result of the rather turbulent development of the entire sector over the past two decades. Following the initial commercial and international success of Czech games at the turn of the millennium (*Mafia*, *Hidden & Dangerous*, *Operace Flashpoint*), when there were only a few strong game companies in the CZ, the game industry went through a downturn. This was due to the emergence of a new generation of play consoles and the resultant huge jump in operational costs, particularly for human resources.

An illustrative case is the game **Mafia**. **A team of approximately 20 people worked on Mafia I, while over 100 developers worked on Mafia II for the new generation consoles.** The increased costs forced companies to work with large publishers, who provided the needed finances for development of these robust products. In the CZ this led to a number of consequences: the demise of some firms, the sale of the strongest company Illusion Softworks to a foreign entity and a search for new sources of income from other sectors. But developers gradually began adapting to the new conditions, e.g. by turning to mobile games where robust teams are not needed, and also strengthened a new distribution channel for PC games, the digital platform Steam, which lowered the market entry barriers.

Age of companies

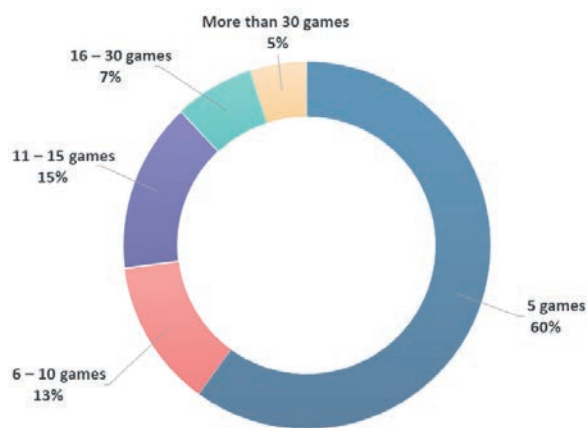
- 21% companies are startups founded in last 3 years
- 23% companies founded 3-5 years ago
- 32% companies founded 5-10 years ago
- 18% companies founded 10-20 years ago
- 6% companies founded more than 20 years ago



The average age of most development companies is currently about 6 years and the low number of employees in Czech game companies is naturally reflected in the number of games published to date. Development of a single game can take two to five years and even more for big budget games. Outside of medium or large companies, of which there are very few in the CZ, a company's entire development team works on the single product for the whole development period. Given that most Czech companies were established in the last ten years, almost 60% have published fewer than five games since their founding. There are only a few companies on the market which have published more than 20 games.

Number of games published since company founding

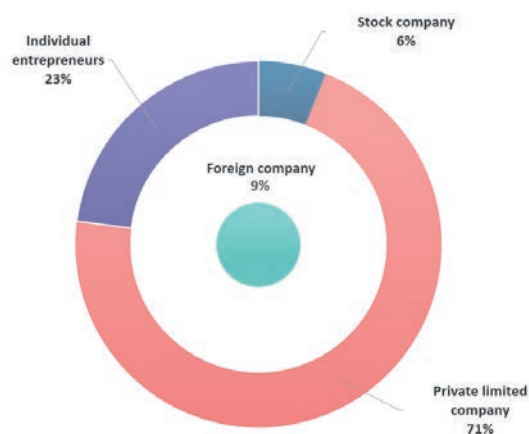
- Nearly 60 % companies released 5 or less titles
- 13 % companies released 6 to 10 titles
- 15 % companies released 11 to 15 titles
- 7 % companies released 16 to 30 titles
- Nearly 5 % released more than 30 titles
- Rest of the companies are working on their first title



A company's age and size influence its legal form. Limited liability companies are the most commonly used legal form in the industry in the CZ. Only 6% are joint-stock companies. 9% of companies were established as branches of foreign companies and only one, the largest and one of the oldest in the Czech industry, has expanded abroad: Bohemia Interactive, which has expanded to three countries (Thailand, the Netherlands and Slovakia).

Legal form

- 71 % studios are private limited company
- 23 % studios are individual entrepreneurs or group of entrepreneurs
- 6 % studios are stock companies
- 9 % studios are branch of international company



The Czech Republic is unique in the high number of domestic game companies. Or more precisely, companies with domestic capital. In contrast, in Romania for example, more than half of the game developers work in branches of foreign international companies.





3.8

Segmentation of the video game market

Personal computers are still the dominant platform for Czech development companies with a small staff and low level of funding.

Development of games for PCs and consoles (67%) continue to dominate over development for mobile platforms. 20% of studios are developing games for gaming consoles and 41% of companies focus on mobile development. This is due to the easier market entry: compared to more expensive and thus less widespread use of consoles, almost every household has a personal computer today. Companies usually mainly develop games for personal computers and only later modify them for game consoles. Only one of the respondent companies develops games solely for console platforms. One-third of the companies develop games exclusively for mobile platforms.

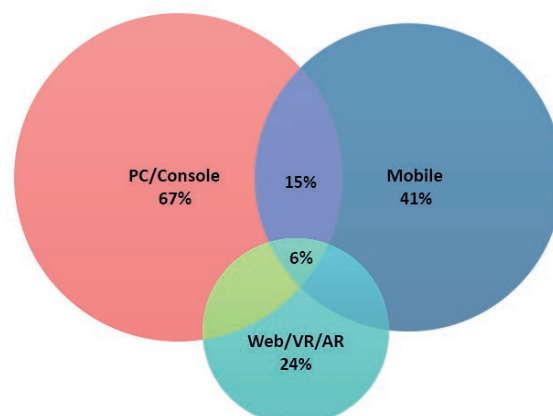
Game companies are beginning to work with virtual reality or augmented reality tools. More than 8% of the respondents use these tools, while only a very small fraction (4%) specializes solely in this platform. These companies include DIVR Labs, which developed the game Blue Effect and also operates the experiential VR game GolemVR. Another is Beat Games, which developed the rhythmic dance game Beat Saber which has done very well globally. There are also several VR game development companies: Madfinger Games, Keen Software and SCS Software.

Development for specific platform

- PC/Console – 67 %
- Mobile – 41 %
- Web – 16 %
- VR/AR – 8 %

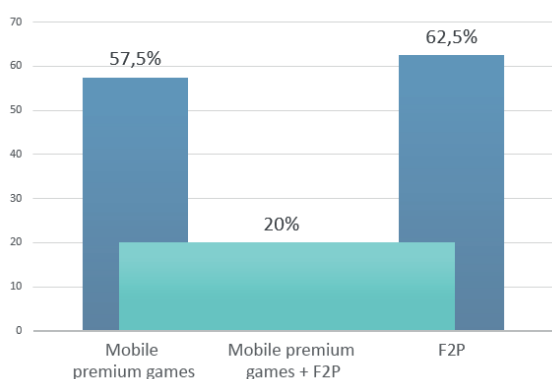
Multi-platform development

- PC and console – 20 %
- PC, console and mobile – 15 %,
- PC, console + mobile + AR/VR – 6 %



Monetization model in mobile development

- Mobile premium game – 57,5 %
- Mobile F2P games – 62,5 %
- Premium and F2P mobile games – 20 %



3.9 Czech video game players

Games, whether on a computer or mobile phone, are no longer just entertainment for children and high school students. According to a study by PayPal from 2018, the average age of Czech players is 33. Contrary to popular opinion, not only men play video games: up to one-third of Czech players are women. Although action and shooting games are still popular, the PayPal study found that more than two-fifths of Czechs prefer games with a guide, where a story is accompanied by a video. In general, there is a global increase in this trend of developing games offering a calmer and slower pace instead of competitiveness and the overcoming of obstacles. Czechs are also willing to pay heavily for game entertainment. In recent years game expenditures have ranged around CZK 4 billion per year.

3.10 Educational system

The Czech educational system offers very few fields of study directed towards professions in the game industry, although the situation is slowly improving through the development of courses at secondary schools and universities. Today there are only a few fields of study specifically focused on game development education which

generate graduates suitable for employment in game companies.

In addition, there are a larger number of affiliated fields of study and university subjects which give graduates partial knowledge applicable in game development.

It is clear that video game studies are in the very early stages in the Czech Republic. For example, the Master's programme in Computer Graphics and Game Development at the Faculty of Mathematics and Physics at Charles University in Prague was established only in autumn 2015. The development and accreditation process for this field of study took almost ten years. A considerable obstacle is the lack of qualified and accreditable guarantors for these fields of study, and the fact that experienced game developers tend to be too busy to commit to long-term lecturing positions at universities.

University students are often not allowed to conduct theses pertaining to video games because their instructors have no experience in this field and thus prefer not to permit such work.

3.11

Collaboration with research institutions

However, when a university has staff with an interest in video games or scientists researching new technologies that are significant for the game sector, successful collaboration with the commercial sector can emerge.

During development of its most recent game, Warhorse Studios began working closely with a team of postgraduate students at the **Faculty of Mathematics and Physics at Charles University** to develop a new generation system to control a complex open world game including all of the entities in this simulation. Subsequently the entire research team was hired by this company, where it completed the entire project, which is also used in the game *Kingdom Come: Deliverance*.

Another example of successful collaboration is the project *Czechoslovakia 38–89*, which was the game of the year in 2015. This game was developed at the Faculty of Arts and the Faculty of Mathematics and Physics at Charles University and the **Institute for Contemporary History at the Academy of Sciences of the Czech Republic** as part of the project “Stories from the history of Czechoslovakia: Research and experimental development of software simulations to teach the history of the Czech lands in the 20th Century” funded by the Ministry of Culture of the Czech Republic.

The Charles University team followed on the success of *Czechoslovakia 38–89* with its next game, ***Attentat 1942*** (2017), which once again uses an interactive format to teach players about the period of Nazi occupation



during World War II from the perspective of people who experienced the war.

Unlike Czechoslovakia 38–89 (designed exclusively for educational purposes in secondary schools), it was released as a stand-alone product for worldwide distribution and was therefore created in other language versions (English, German and Russian) as well. The civic associations Post Bellum and Generation Europe took part in the development of the educational simulations.

3.12

Government support for the video game sector

As part of the cultural and creative industries and/or the digital economy, the game industry is discussed in the following national strategy documents:

- **Digital Czech Republic** is a government programme for digitization in the Czech Republic. Most of the goals involve support for video games, especially goal 2.12 Development of high added value products and services, involvement of modern expertise, innovation, cultural and creative industries, building of domestic brands and promotion of exports.
- **The 2016–2020 National Research, Development and Innovation Policy** is the top national-level strategic document, which sets out the main guidelines for research, development and innovation and covers other related strategic documents of the Czech Republic. For the first time ever, this document defines the topics of applied research discussed and agreed upon with representatives of the private sector in 2014 and 2015. Digital games are discussed in **Digital Economy and Industry 4.0**, which includes topics relevant to the game industry, such as data processing, 3D visualization, development of new digital solutions and services, cybernetics and artificial intelligence methods and techniques, and digital skills and knowledge. In **New cultural and creative industries**, the relevant topics include development and sale of functional software, development, innovation and conceptual work in technology, design and laser light in audiovisual art, surround sound and interactive technologies, immersive environments and ground-breaking technologies in art and its presentation. There is a complete lack of specific calls for the implementation of this kind of research.
- **The RIS 3 strategy** ensures effective targeting of European, national and private funds to boost the economy's competitiveness in research, development and innovation. The RIS 3 strategy includes research priorities that are most relevant to the game industry. These involve research on the impact of technology on society and individuals in new creative industries, such as research on the social impact of technology, especially on law, social media and citizen participation in democratic processes in the Czech Republic, new research areas and possibilities with a potentially significant impact on innovations introduced through new technologies in digital humanities, language technologies, computer and corpus linguistics, digital game industry technologies, digital technologies to support creative production and new audiovisual formats, text and data mining in the humanities and social sciences, preparation of necessary data sources for applied research in the social sciences and humanities, language technologies, computer and corpus linguistics, access to cultural heritage and promotion of cultural identity, support of applications with economic impacts in industry and services, access to methodologies such as person, prototyping and others, service user behaviour (area studies, ethnology and anthropology) and research on copyright and intellectual property rights in relation to new technologies. In media production, there is relevant research in the performing arts and architecture – spatial work, spatial application of new presentation techniques, use of new interactive techniques for spatial work, use of new materials suitable for increasing spatial effectiveness from a media perspective (visual, acoustic, surface tactile properties, etc.), application of advanced spatial design technologies, application of advanced technologies to enhance spatial efficiency (deployment of virtual reality and visualization technologies as part of architecture or scenography projects, etc.), research, development and application of new communication technologies for remote collaboration in the scenic arts and architecture and use of unique locations in the Czech Republic for the film industry. Many other research priorities are also discussed in the sections

Electronics and Electrical Engineering in the Digital Age (where sensors, robotics, human-machine collaboration and virtual and augmented reality, such as the development of glasses are mentioned under the Industry 4.0 concept) and Digital Economy and Digital Content (where processing of large volumes of data and tools based on artificial intelligence are mentioned). There is a complete lack of specific calls for implementation of research for the needs of the game industry.

- **The Small and Medium Enterprises Support Strategy 2014-2020 and the International Competitiveness Strategy 2012-2020** aim to create favourable conditions for creative entrepreneurship, innovation and growth. There are no specific measures to support creative industries.
- **The 2012–2020 Export Strategy of the Czech Republic** prioritizes promotion of exports with high added value and moving Czech exporters closer to end customers in the value chain. However, export of creative products has not been supported to date.
- **The 2015-2020 Government Cultural Policy** prioritizes, among other things, support of the cultural and creative industries, which include the game industry. The aim is, among other things, to use cultural heritage and cultural activities, services and assets to develop the economy, increase competitiveness and promote mobility. The strategy is aimed at designing inter-ministerial tools to support the competitiveness of the cultural and creative industries. There has been a lack of specific measures to support the game industry so far.

The current funding options for the game industry are not based on the above-mentioned national policies as they have not been followed by any specific measures. Some specific regional programmes to support innovation, such as creative vouchers, which are, however, limited to start-ups in Prague and to traditional industries in Brno (advanced engineering and manufacturing technologies, precision instruments, software and hardware development, medicinal products, medical care and diagnostics, technology for the aerospace industry), as well as EU programmes such as Creative Europe and Horizon 2020 make up for the lack of domestic support.

Creative Europe support for video games

The Creative Europe programme supports video games under its Creative Europe MEDIA sub-programme. The support is intended for video game concepts or projects which, in comparison with the existing majority production, represent original, innovative, creative and culturally distinct works that enrich the European cultural identity and heritage.

Another important aspect for support is the game narrativity, the originality of the gameplay, the user experience and the visual concept. The supported projects should have some commercial potential not only on the domestic but also on the international market.

In 2018, the Creative Europe programme supported 30 video games from 13 countries with a total of 3,720,000. EUR.

The last Czech project supported was the horror adventure game *Someday You'll Return* by CBE Software in 2016 and *Phonopolis* by Hammerware in 2013. In 2018, no Czech company received support.

Czech applicants still encounter problem with the basic rule when assessing the application - the necessity of one commercially distributed game, which is often an obstacle because of the fragmentation of the Czech video game industry - many companies will disappear after the game is produced, others are absorbed by larger market players. Another problem is the requirement for narrative in the game, which is also a problem for companies in other European countries, not only in the Czech Republic.



KEY FACTORS FOR FURTHER DEVELOPMENT OF VIDEO GAMES IN THE CZECH REPUBLIC

4.1

Education

The primary factor for improving competitiveness of the game industry in the Czech Republic is development and support of education. Game development naturally requires use of mathematics, programming, IT knowledge, aesthetics, cultural plurality, economics, as well as the synthesis of artistic, technical and social skills, work with information and teamwork. All of these are highly desirable skills in the labour market, which can also be used in many other areas. Game development is popular among students, which increases interest in the study of the technical and artistic disciplines.

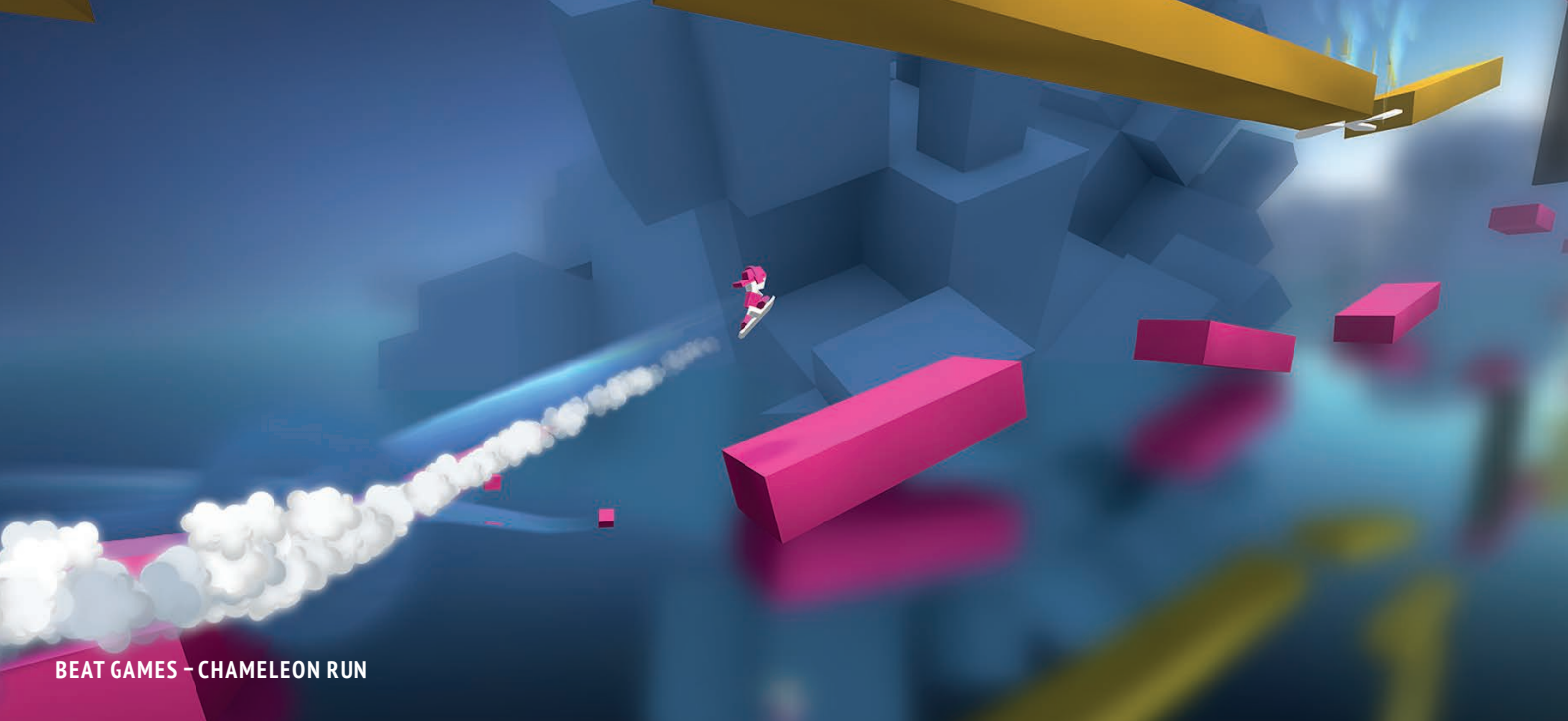
Educational systems supporting this trend begin at the primary level and continue through secondary education to higher education. An equally important part is further education, which brings students closer to practice, or supplements traditional education with practical knowledge and skills. The current systems of initial³⁹ and further education are not focused on instruction aimed at game industries, especially at secondary schools and universities. Greater technical orientation (working with the game engine in IT lessons, or physical simulations in the game engine in physics lessons) and, for example, integration of new technologies in art lessons (3D software modelling) are key at the elementary level. Therefore, this type of instruction is usually implemented by the private sector and there is a lack of systemic government support for subjects relevant to the game industry.

The key issues and shortcomings of the current situation include:

- **Very limited opportunities for education in the game field** – only related fields (programming at technical colleges, graphics and animation at art and film schools) can be studied at secondary schools or universities; there is a lack of specialized video game development professions such as programmers, software analysts, script developers or technical designers, as well as artistic professions such as a graphic designers (2D and 3D, conceptual artists), animators, sound engineers, musicians, screenwriters or directors, and other professions such as video game designers.
- **Weak emphasis on supplementing education with the use of modern technology** – students receive sufficient qualifications only for traditional disciplines, such as classic illustrators, graphic designers or animators (frame animation). These professions are, however, scarcely needed for video game development. There is a lack of qualified guarantors, teachers and lecturers for these new professions.
- **Poor link between schools and businesses** – few educational incentives to support such cooperation, as well as the lack of interest from businesses in such collaboration. There is no legal framework that clearly defines the rights and obligations of schools, businesses, and pupils (minors), including insurance.

For example, the Association of Czech Game Developers currently co-operates with Charles University and provides links to game companies and mentors for student teams.

- **Lack of support for professional training activities** – specialized seminars, workshops, summer schools, intensive courses or incubators and accelerators that support transfer of know-how in the game industry.



- **Lack of opportunities to gain experience** – an inadequate system of internships and lack of complementary forms of study to ensure acquisition of practical knowledge and skills.
- **Legislative limits to internships** – universities can grant students credits for internships, but internships are usually short-term (a number of days – up to 200 hours in total). Students are unable to acquire the necessary competencies during such short internships. Unfortunately, the current legislation does not specifically set forth the rules of internships; the rules are partially stipulated, for example, in the statutes of universities. Nevertheless, the absence of legislation makes it difficult for students to gain experience and worsens their job prospects in the labour market.

These problems lead to a shortage of both graduates and quality/senior workers (programmers, graphic artists, animators) in the labour market. Thus, there is a tug-of-war over skilled workers not only among game companies, but also across the board, as technical professions are also in demand in other industries. In terms of products, Czech game companies do not compete with one another very much and it is common for companies to collaborate. However, there is fierce competition for skilled labour, as in other sectors, but in this case also with foreign companies.

Initial education starts in childhood and ends with entry in the labour market or another time lag after its completion. Further education is usually considered adult education.

Strategic steps proposed to change the current situation:

- **Supporting the emergence of new disciplines**
 - Supporting the emergence of new technical disciplines focused more on game development (game engine programming, game engine use, game mechanics scripting, analytical design and game structure development).
 - Supporting the emergence of new artistic disciplines focused on the use of modern technologies (3D graphics and 3D modelling, computer graphics animation, visual effects, motion capture use, facial animation and 3D image scanning).
 - Supporting the emergence of new game-specific disciplines (game designer, video game production).

- **Linking teaching with practice**
 - Supporting practitioner involvement in teaching at secondary schools and universities.
 - Linking game companies with universities at least for the assignment of final theses.
- **Promoting professional training activities**
 - Supporting further education, including professional training through specialized seminars, courses, workshops, or summer schools.
 - Implementing and developing innovation, incubation and acceleration centres – the existing centres are focused on different needs than those of the gaming industry.
- **Improving student internship opportunities**
 - Reserving time for high school and university teachers to participate in internships in companies. Providing participants with financial support or benefits for gaining practical experience. For example, 2K Czech has made attempts to educate teachers.
 - Allowing/introducing compulsory semester-long internships for university students as a part of their studies, i.e. for credits.
- **Promoting interest in the field**
 - To date neither the public administration nor the public service media have fully regarded the cultural and creative industries as important industrial sectors with great export potential and added value. As a result, the traditional cultural and creative industries such as the visual arts, theatre, film or animation are still preferred in terms of both business support and presentation, while the new technology-related industries such as video games are marginalized, and the public administration does not help promote the prestige of this industry among the public.
 - (Online) programming courses for 6–8 year-old children (teaching of game algorithms, literally “school by play”, where children design, draw and program, and then play what they have developed).
 - PR – the involvement of celebrities and media coverage of achievements that would attract talents to the industry.
- **Legislative changes**
 - Creating legislation that would set out precise conditions and rules for internships in companies for high school and university students.
 - Increasing the maximum number of hours for on-the-job training at secondary schools and universities through credited internships.
 - Introducing and assigning higher ranking to subjects specializing in game development.



4.2

Promoting business, export and investment

The demanding nature of game development and the strong export orientation of the game industry described in Chapter 2 make game companies focus on exporting goods and services to EU and non-EU countries and to present their products abroad. Greater promotion of the game sector in the Czech Republic is also a tool for attracting talents and experts as employees. All these aspects require stronger government support and overall development.

The key issues and shortcomings of the current situation in terms of business and export support include:

- **The lack of tools to promote presentation abroad** – the presence of the Czech Republic at international trade fairs such as gamescom in Germany, E3 in the USA, Tokyo Game Show in Japan and others is still very limited. Czech companies have been present either individually on their own, or through initial attempts to have national stands, which had negligible or rather poor support. Other countries systematically support their game sectors (e.g. Nordic countries, Germany, the UK, etc.), including national stands at these conferences, which are mainly intended for smaller and start-up game studios. The support in the Czech Republic is significantly lower.
- **Unequal support conditions** – support for promotion abroad is now possible only through the CzechTrade programmes funded from the European Structural and Investment Funds, which, however, exclude the participation of Prague-based firms where most of the cultural and creative industries are concentrated. CzechInvest's presentation of the Czech game industry makes up for the lacking support to a certain extent. However, this support does not saturate the demand nor does it correspond to the strength of the game industry or the global potential of Czech products.

For example, support for film industry participation at the Berlinale or Cannes festivals is significantly higher. The film industry has established a special organization called the Czech Film Centre under the auspices of the Czech Film Fund and the National Film Archive, which helps present Czech films abroad. For Prague-based companies, innovation support is limited to start-ups less than three years old, which makes most of the Prague-based game firms ineligible for support. However, each game industry product represents a new development process and innovation and carries a high risk that the public sector does not help eliminate, especially for small businesses.

- There are no **tools to support entrepreneurship and exports**; there is no specific support solution for Prague-based companies that do not have access to resources from the European Structural and Investment Funds. Support provided by the Czech Export Bank (CEB), Export Guarantee and Insurance Corporation (EGAP) or the Czech-Moravian Guarantee and Development Bank (ČMZRB) is intended to finance export-oriented production and development, but has not yet been used to finance products of the cultural and creative industries; rather, it focuses exclusively on the traditional industries.
- **Lack of awareness of export opportunities** – game companies are not systematically informed about government support options.
- **Complicated employment of foreign workers** – the extensive administrative workload associated with hiring non-EU workers and the long visa application process discourage companies from dealing with these candidates in the very first phase of the selection process, thereby reducing the number of suitable candidates for some key positions to zero. Nevertheless, going forward, companies are looking to increase the number of foreign employees.

- **A complicated situation when entering specific markets, mainly in Asia, but also in South America.** For example, China, which is the global leader in game industry revenues, has very strict regulations and requires that Czech companies have a local (Chinese) partner. Other Asian countries such as South Korea and Japan have different legal measures and regulations. In this context, game companies need advice and support from the government, such as official participation in missions by leading political representatives.
- **Dependence on foreign companies** such as Facebook and other social networks in user acquisition.
- **Costly and complicated rating system** – PEGI rating (a European video game rating system that informs consumers about the content of the game, allowing them to make informed choices), the ESRB for North America, and other systems in other regions. On mobile devices, a simplified system is free of charge (an agreement between Google and Apple platform operators is expected; completed by the companies themselves).

The above-mentioned shortcomings and lack of support weaken the competitiveness of Czech game companies in global markets. A remedy needs to be found to put the Czech game industry at the same level as foreign companies and ensure that it is not disadvantaged in international competition.

Strategic steps proposed to change the current situation:

- **To adopt measures for more effective support** of Czech companies participating in prestigious foreign trade fairs, even for Prague-based companies which are currently less eligible for public support compared to companies operating outside Prague.
- **To provide legal** and other assistance related to exporting of products to EU and non-EU countries.
- **To allow government export financing support from the Czech Export Bank or ČMZRB** to extend to game industry products.
- **To ensure diplomatic and political support** for the promotion of the Czech game industry abroad.
- **To make sure** that government institutions **better inform** game industry companies about support options.
- **Legislative changes** – to simplify the visa application process for skilled non-EU workers, to set up a transparent and comprehensible legal framework for high school and university student internships in companies.

Another area related to the development of the game industry is investment support. A specific characteristic of the Czech market is that companies are mostly owned by domestic capital. While new distribution options reduce production and market entry costs, allowing the sector to offer business opportunities for start-ups, the key factors for these businesses are investors and access to capital. Unfortunately, access to capital is not sufficiently developed in the Czech Republic.

In terms of investments, the digital game industry can be divided into three basic groups:

young start-up companies – driven by investors

young independent companies – own sources of financing

established players – do not have or need investors

One-fourth of all game companies are at least partially funded by investors. Unlike other countries, in the Czech Republic there is a lack of investors specializing in games. Czech game companies such as About Fun and DIVR Labs have a specialized foreign investor.

Well-known Czech companies that have invested in game companies include Synot, Rockaway, Zdeněk Bakala (as a natural person) and KKCG. Investors provide game companies with investment capital, but the required know-how that a specialized foreign game investment company can offer is sometimes missing.

The key investment-related issues include:

- **Burden of long-term financing** – the development of a game lasts several years (over 5 years for high-budget titles), which poses a high level of risk.
- **Low awareness of the game industry** – a lack of awareness of the investment potential and a fear of the industry reduces investor interest.
- **Lack of financial support for start-ups** – for example, the Slovak Arts Council set up a subsidy programme designed for the game industry⁴¹ in the Slovak Republic in 2017, which distributed EUR 650,000 among 50 projects in the two initial one-year cycles (study by SGDA).

The programme is primarily intended for young start-up companies facing an underdeveloped investment environment and poor access to capital in the game environment, similar to the Czech Republic. The aim of the programme is not only to reduce the risks in the initial years of business, but also to attract new creative game developers to the game industry.



- The need to protect the interests of the domestic sector – while there is no government support specifically targeting the needs of Czech game companies, CzechInvest offers investment incentives for foreign companies willing to enter the Czech market. Representatives of Czech game companies perceive such support as very risky as it could lead to a transformation of the Czech game market to a mere outsource market for foreign competitors of Czech companies without any higher added value and to increased competition in the labour market. An example of this is Romania, which foreign companies use as a source of cheap labour. However, the Czech Republic is not in this situation (over 90% of the companies are in Czech ownership – Chapter 3.7) and it is not desirable to lure it into this trap. Entry of international companies into the Czech market and establishment of a branch is desirable, but only if the company agrees to invest into the development of the game environment and to support education that will attract new people to the game industry.

Strategic steps proposed to change the current situation:

- **To raise awareness of the game industry among local investors** – to increase the attractiveness of the industry, to highlight successful examples; most current investors have seen their investments returned and paid off.
- **Protecting the interests of the domestic game industry** – attracting foreign investors only under very specific conditions which will not jeopardize the competitiveness of Czech game firms, especially due to the outflow of skilled workers.
- **To support entry of foreign specialized investors into the Czech market** – constant market growth, high rate of new companies, growing percentage of successful companies.
- **Financial support for start-up companies** – subsidy options for the initial phase of the company's existence, support for specific titles, reducing the risk of initial long-term development.
- **Support for investors** – reducing financial burdens, e.g. by offering tax relief or investment incentives (or equivalents) to domestic companies. Improving the business environment, e.g. by creating facilities for qualified investors and mentors, such as incubators or accelerators.

4.3 Research, development and innovation support

The success of the game industry depends on extremely challenging product development processes which last several years and are associated with enormously rapid technological development. Businesses lack development support tools that would at least partially reduce their business risk as is common in all traditional firms that have access to R&D programmes.

A specific characteristic of the game industry is the long and costly game development process (one to three years for mobile games, three or more years for PC and console games). In order to optimize costs, companies reduce the amount of money spent on developing and researching new technological solutions and are more likely to invest less in buying ready-made tools and technologies. However, this reduces their competitiveness and the potential to be at the cutting edge of technology with foreign competitors and may also have a negative impact on the quality and marketability of the final product, which they try to complete as quickly as possible in the final phase of development.



The key issues in technology development and research include:

- **The increasing capital intensity of developing proprietary technology** and, in this context, decreasing expenditures for development and research of new technology solutions by the private sector due to the difficulty of financing such development purely from private sources. Proprietary technological development and research is only conducted by the largest companies, e.g. most of Bohemia Interactive's and SCS's games are based on their own technology. Warhorse made significant changes to (reprogrammed) the engine and added new systems that were missing in the original engine. They worked closely with the German company that designed the original engine. The vast majority of small businesses purchased an engine, which, however, limits their ability to become a market leader. Large firms, including Czech companies that have these ambitions, are investing heavily into the development and research of technologies to get to the top or to stay there. Abroad, they are supported directly by subsidies. For example, CD Projekt, a Polish company which released The Witcher, drew over EUR 7 million in 2016 to develop new technology for its next title.
- **The absence of support tools for research, development and innovation.** There are no specific programmes or calls for research and development in the game industry, technological (incubation) facilities or research infrastructure and other tools. In Poland, for example, the "Smart Development Operational Program" was introduced for 2014–2020, focusing on development science and research, including a programme for the game industry. The annual subsidy totalled PLN 100 million (about CZK 600 million). In 2016, PLN 116 million (approximately CZK 700 million) was distributed under this programme to support research and development for Polish game companies. Most of the successful projects concerned research and development of proprietary technologies for new rendering techniques or low-level video game software solutions. As of 2019, the German government has launched a game support fund under the auspices



SCS SOFTWARE - AMERICAN TRUCK SIMULATOR

of the Federal Ministry of Transport and Digital Infrastructure (BMVI). The planned budget for the first year is EUR 50 million (about CZK 1.3 billion) with a planned increase up to EUR 100 million (about CZK 2.6 billion) per year in the next five years. The fund's programmes are expected to support in particular research and development of new technological solutions.

- **Unequal conditions at the European level** – support of research, development and innovation for the needs of the game industry is heavily subsidized by the public sector in neighbouring countries.

Strategic steps proposed to change the current situation:

- **Increasing spending on the development and research of new technological solutions**, e.g. along the lines of neighbouring Poland.
- **Creation of research, development and innovation programmes to increase the competitiveness of the game industry** – e.g. a specific programme or call for research and development in the game industry, support for the establishment and funding of technological (incubation) facilities, support for the development of research infrastructure for the development of new solutions and the application of new technologies in the game industry, etc.

CONCLUSION AND KEY RECOMMENDATIONS

The game industry is a model industry based on modern technology with enormous growth potential, similar to other segments of the cultural and creative industries and the digital economy. This potential needs to be reflected in government policies and legislation, as well as in allocation of financial support for specific measures.

At present, the biggest problem is that all government policies and strategies (as outlined in Chapter 3.12) **lack the implementation level, i.e. through concrete measures and support tools** tailored to, or at least reflecting, the needs of the game industry. The problem is not that strategic documents do not provide a basis. The problem is that the **declared support for creative industries does not go beyond statements of intent and is not implemented in practice, either as research, development and innovation support, or cultural support, or export and investment support, or SME support.** For example, compared to the film industry, there is almost no support for the game industry, despite the fact that the totally unsubsidized development of video games generates more than twice as much revenue as the generally subsidized film industry.

Therefore, systematic support for the development of video games is needed. The government (especially the relevant ministries such as Industry and Trade, Culture, Education or Social Affairs) needs to start paying serious attention to supporting the development of video games and, in discussions with representatives of the game industry, propose a package of comprehensive support measures and tools reflecting the specific needs of the game industry. It is a long-term effort although some requirements can be resolved in the short-term (e.g. visas) or medium-term (e.g. a special research and development programme or design for the legal framework of internships for secondary school and university students).

Short-term goals

Education

- ⬆ Financial support for further (professional) education within the sector
- ⬆ Improving conditions for student internships and ensuring that schools recognize internships as on-the-job training

Business activities

- ⬆ Visa programme support – the game sector currently lacks 184 skilled workers
- ⬆ Political and diplomatic support for export of games, legal and other export-related assistance to companies
- ⬆ Raising awareness about support options among businesses

Medium-term goals

Education

- ⬆ Creating new technical and artistic disciplines
- ⬆ Enabling the involvement of practitioners in teaching

Business activities

- ↑ Improving support options for Prague-based businesses
- ↑ Enabling the game industry to benefit from export financing support, such as guaranteed loans or development or export subsidies from CEB and EGAP, or ČMZRB
- ↑ Improving start-up companies' access to financing in the early stages of business

Research, development and innovation

- ↑ Under the existing programmes, creating calls for proposals for game company R&D

Long-term goals

Education

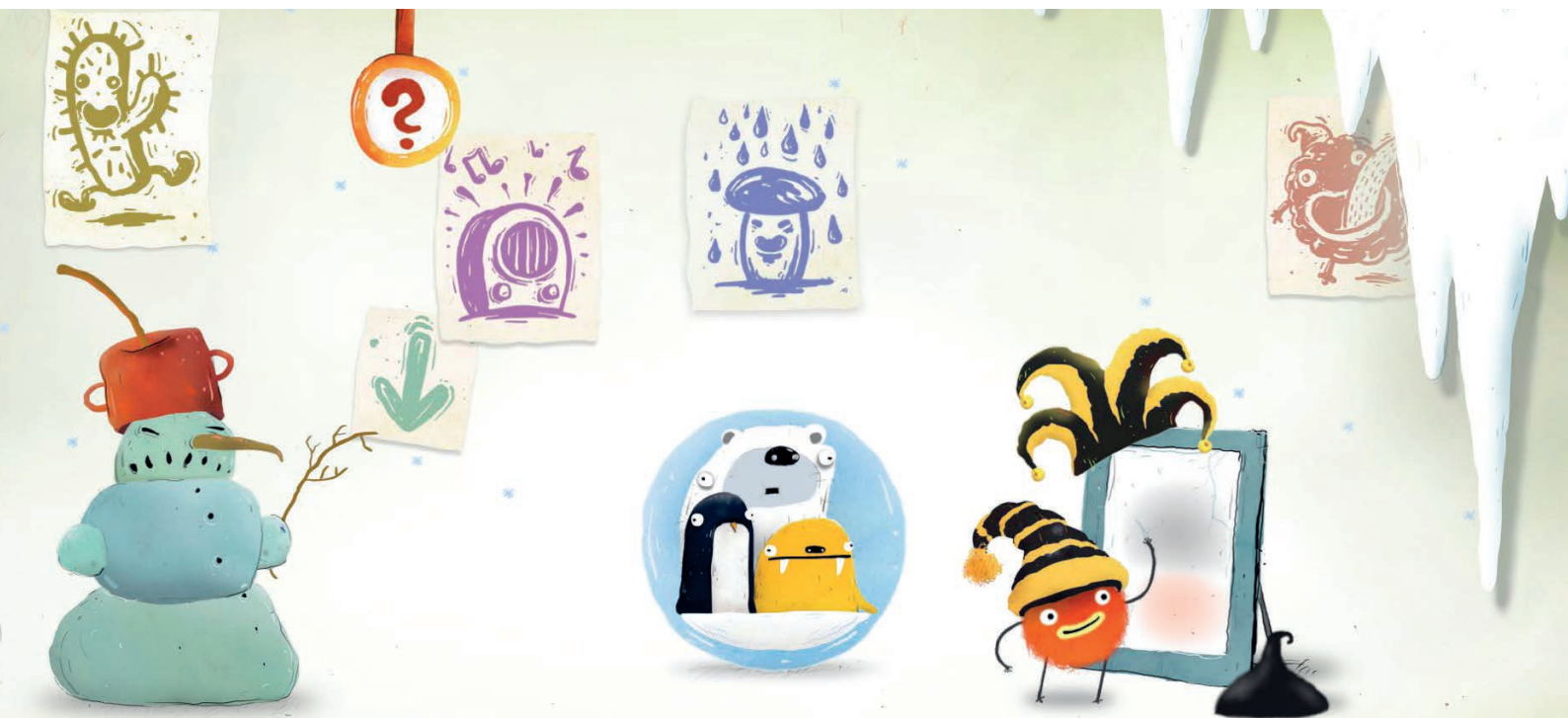
- ↑ Adopting legislation to govern collaboration between companies and schools regarding internships as well as general education at all types of schools (primary, secondary, tertiary)
- ↑ Enabling a more flexible system of creating new disciplines and improving the ability of the educational system to respond to rapid technological development

Business activities

- ↑ Establishing a special fund for the game industry similar to the Czech Film Fund

Research, development and innovation

- ↑ Creating a special research and development programme for the game industry, following the example of Poland





ANNEX

Czech game developers

List of Czech game developers

1. 2K Czech, s.r.o.
2. AAAGames s.r.o.
3. About Fun s.r.o.
4. AdlexApps
5. Alda Games s.r.o.
6. Allodium s.r.o.
7. Amanita Design s.r.o.
8. Artax Apps – soucast ARTAX a.s.
9. Ascendant Studio s.r.o.
10. Attu Games s.r.o.
11. BadFly Interactive, a.s.
12. Beat Games s.r.o.
13. Beresnev games
14. Bispiral, s.r.o.
15. Blue Pulsar Games s.r.o.
16. BOHEMIA INTERACTIVE a.s.
17. Buffa Software s.r.o.
18. Cableek Games
19. CBE Software s.r.o.
20. Cinemax, s.r.o.
21. Circus Atos s.r.o.
22. Clayburger s.r.o.
23. Contra Concept s.r.o.
24. CoolWorks Studio, s.r.o.
25. Craneballs s.r.o.
26. Cybernautica Games
27. Czech Games Edition s.r.o.
28. DIVR Labs
29. Dreadlocks Ltd, organizační složka
30. DynamicDust s.r.o.
31. Elecube s.r.o.
32. Enteron
33. Fanatic Games spol. s r.o.
34. Fineway Studios Czech s.r.o.
35. FiolaSoft Studio
36. Gamajun Games
37. GAMEE Mobile
38. Gametoria s.r.o.
39. gamifcc games s.r.o.
40. Gammosaur s.r.o.
41. Geewa a.s.
42. GIANTS Software CZ s.r.o.
43. GoldKnights s.r.o.
44. Grip Digital
45. Hammer Games s.r.o.
46. Hammerware s.r.o.
47. Hanganit
48. Hexage
49. HGames-ArtWorks s.r.o.
50. Honestly Games s.r.o.
51. Charged Monkey
52. Charles Games
53. Infosfera s.r.o.
54. Inputwish s.r.o.
55. Jan Zelený
56. Just Two s.r.o.
57. Keen Software House a.s.
58. Kubat Software
59. Kube Games s.r.o.
60. Lightning Soft
61. LittleColor
62. Lonely Vertex s.r.o.
63. Madfinger Games a.s.
64. McMagic Productions s.r.o.
65. Mingle Games s.r.o.
66. Mouse Memories
67. Mugeaters
68. Napoleon Games s.r.o.
69. NoEZ Games
70. Nepos Games, s.r.o.
71. Notre Game s.r.o.
72. NOXGAMES s.r.o.
73. Old Oak Den
74. Outside the fox
75. Oxymoron games s.r.o.
76. PacoGames
77. Pandastic Games s.r.o.
78. Paper Bunker s.r.o.
79. Paperash Studio
80. Perun Creative s.r.o.
81. Playito
82. Please wait
83. Quiet Dimensions s.r.o.
84. Rake in Grass
85. Random Developers
86. RAZAR s.r.o.
87. Running Pillow
88. SCS Software s.r.o.
89. Sever Game Studio s.r.o.
90. SiCzech Arts
91. Silicon Jelly s.r.o.
92. SIMT MHD
93. SleepTeam s.r.o.
94. Smirk Game Studios a.s.
95. sQuaricon Prague s.r.o.
96. Straitjacket Entertainment, s.r.o.
97. Studio Pipe dream
98. SZEINER Software Company
99. TechSophia s.r.o.
100. Trickster Arts s.r.o.

101. Twin Petes s.r.o.

102. Tylcham Studios s.r.o.

103. Vindiez Games

104. Vionsoft

105. Volcanoid s.r.o.

106. Wargaming Prague s.r.o.

107. Warhorse Studios s.r.o.

108. Wonderful Tree Studio s.r.o.

109. WoodDog Games

110. Wube Software

Czech publishers and distributors

List of Czech publishers and distributors

1C Publishing EU s.r.o.

ABC Data s.r.o.

Cenega Czech s.r.o.

ConQuest entertainment a.s.

Oklahoma s.r.o.

Microsoft s.r.o.

Playman s.r.o.

Sony Czech, spol. s r.o.

Špidla Data Processing s.r.o.

Xzone s.r.o.

