



BitDegree

WHITE PAPER

Revolutionizing Global
Education with Blockchain



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Please read this entire section and do not take any actions until you finish it.

This White Paper is a summary of BitDegree's business model and technology, plus a brief introduction to the BitDegree fundraising principles, and it should be read in its entirety.

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○ SUMMARY

The conventional centralized higher education system takes 4-6 years to educate a person and there is no guarantee of employment afterwards. We believe that the digital industry today lacks workforce because higher education institutions are not responding to the needs of actual labor market. Most of the skills needed by the digital industry don't even require a degree in higher education. Workforce that has practical digital economy skills and willingness to learn is needed. That is why today more and more tech-savvy teens get freelancing jobs and earn more than their parents do.

BitDegree is world's first blockchain-powered, smart-incentives based online education platform which will revolutionize global education and tech recruiting. The main purpose of the BitDegree platform is to let Students acquire skills that are currently required by the labor market. The way to do it is not to ask business what skills they need in the far future (3-5 years), but to respond to explicitly expressed skilled labor demand quickly. BitDegree will directly align the incentives of students and anyone who wants them to become knowledge workers in digital economy - like current or potential employers, digital service providers and sponsors. Smart-incentive is a smart contract on Ethereum network ensuring the exchange of tokens between a sponsor (the Incentive Creator) and a student (the Incentive Taker), who is committing to study a specific subject in order to receive tokens (the Incentive). The BitDegree platform will offer students online courses with a clear and transparent blockchain-based reward system and achievement tracking. Our use case for blockchain is not sensitive to prolonged waiting periods before transactions are committed, thus, overall platform overhead (as in expenses) of using Ethereum network for transactional and immutable data storage needs, will be low. To make the learning process as exciting as playing Minecraft we will use Octalysis framework of gamification design.

We see BitDegree as a unique tool for business to recruit tech talent and shape global education to its needs through smart-incentives. National government Job centers will be able to track the demand of skills without having to involve scrupulous report gatherings from businesses and also help jobless citizens by subsidising studies for skills on high demand. Think about it as Coursera and HackerRank merged together, powered by blockchain technology. The main benefit of BitDegree platform to incentive providers is the possibility to initiate and maintain dialogue with upcoming talent and reward them for achievements through smart-incentives. Smart-incentives on the BitDegree platform will range from small to large and be location and topic targeted. From the student's perspective, it means getting paid to learn new skills based on local demand, which not only incentivizes but can actually be a viable escape from unskilled work.

Building quality, interactive, and engaging learning experience is essential to every successful education platform. There are attempts to solve the problem: i.e. Coursera and CodeCademy. Despite the fact that these frontrunners face abysmal course completion results, similar to the entire MOOCs industry - just 5%, these two companies together are worth more than \$1 billion today. Our proposed

incentive alignment approach has not been attempted on any of educational platforms of which we are aware. A merit-based reward, currently practiced on existing platforms, does not provide the income needed to support a student while studying.

We will pursue our vision to develop the BitDegree platform regardless of the ICO's outcome. We anticipate a closed-test, involving incentive providers in Q2-2018, and an open launch of BitDegree in Q1-2019. The capital available to the development of the platform will determine its initial functionality and choice of the course material made available. The anticipated capital raised during the ICO, will enable us to directly compete with existing education platforms, even before realizing the benefits of a very popular BitDegree platform. Companies creating technologies used in the digital economy should consider contributing to the development of the platform, if only to ensure that technologies they create are represented in the course material available to millions of students.

WE BELIEVE THAT:

01. Everybody in the world deserves access to proper education, no matter the gender, race, age or religion;
02. The key to success of any technology business is to hire the best and well-educated talent, and thus the business should be ready to invest in such talent;
03. Public education systems are flawed and need to be democratized, decentralized, and otherwise disrupted;
04. Blockchain-powered smart-incentives and gamification features they enable are the game changers.

02. SCOPE OF THE PROBLEM

When we first started to analyze reasons behind and difficulties of hiring tech talent, we looked for possible solutions and then wondered who else would benefit from the approach in which we would take to address the problem. We then incorporated those parties to synthesize new problem scope and tried to find the solution to newly defined problem. As in any of those exploratory endeavors, one must not forget to limit the problem scope to minimum, and to look for solutions providing maximum benefits to parties involved. We settled on a very small group of parties that are benefiting greatly from synergetic solution.

2.1. Employers looking for tech talent

The shortage of tech employees is undeniably global and increasing. According to a [Jobvite research](#), HR professionals report that it's becoming increasingly difficult to fill open positions, and 65% of recruiters claim that talent shortage represents the biggest challenge in hiring¹. Everybody knows that the key to success in any tech company is talent acquisition. By everybody we also mean the talents themselves. Though the salary levels in tech and IT industry are constantly growing, it has been proved not to be a sufficient incentive to attract the best employees and keep them loyal. Companies compete raising and maintaining the employer profile, offering the perks unimaginable in other industries. In the next five years, it is expected for the demand of talent to deliver on new capabilities, to significantly outstrip the supply². It is estimated that the entire recruitment market is worth over \$200 billion worldwide and \$4,000 is the average amount spent by a U.S. company to fill an open position³.

2.2. Service provider looking for educated customers

Service providers invest money and effort to understand the real-world problems and to create solutions to those problems. Most often, many companies provide similar solutions with some specific differentiating features. Their solutions usually become known to new users/adopters via advertising and old-fashioned word of mouth. Companies are spending significant amounts on advertising in order to attract new customers, and to spread the word about their distinct ways of providing value to their customers. For example, a service provider spends on average 300 USD on Google adwords to acquire one new web hosting client. This is a huge amount in a low margin business. By accepting BitDegree tokens, various web service providers, such as Hostinger, will be able to attract a new flow of targeted customers in the most cost-effective way. Naturally, the service and product providers shall also grow the interest to sponsor BitDegree users instead of giving service discounts or vouchers. Tech savvy students and users are valued clients targeted by various industries. By

¹ <http://www.gethppy.com/>

² <http://www.mckinsey.com/>

³ <https://www.forbes.com/>

providing incentivized courses that explain problems and the approaches taken by the company to resolve them as implemented in their offerings, other service and product providers can nurture well informed potential clients. Students with BitDegree scholarships will become qualified clients, ones with a proven interest in learning technology, and a willingness to spend money on various products and services. Qualified clients require less hand-holding from technical support teams, and do not inflate a service provider's support-related costs. As more and more SAAS buying decisions are made by an employee working directly to automate some tasks for his employer, his preexisting exposure to service provider offerings can influence the buying decisions of his company.

Hostinger is the 1st service provider who has agreed to accept BitDegree Tokens in exchange for its services. Any user who learns digital skills on the BitDegree platform will be able to order domain names and web hosting services, and put newly acquired knowledge in practice at Hostinger.

2.3. People seeking knowledge and digital economy based employment

Unskilled labor force is replaced by the automation more frequently. Automation forces unskilled people to acquire new skills in areas where it does not provide cheap alternatives. Most areas requiring knowledge, creativity, feel for aesthetics, and problem-solving skills are becoming better paid, due to the shortage of qualified candidates. So how can one manage to develop new skills in the market today? We have a higher education industry caring for those in need of knowledge, and willing to work hard to develop their skills.

THE CONVENTIONAL LABOR MARKET - EDUCATION MODEL

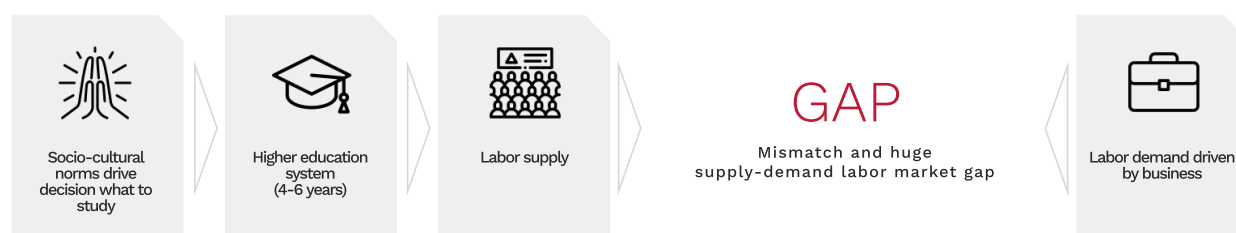


Figure 1. The conventional labor market education model

The Internet has enabled us to reach the universal knowledge pool, to interact directly and informally with the greatest minds of our age. However, the entire global education system has become frozen, using centuries old methods that are virtually ineffective. There is a global need to disrupt the status quo. It is not a surprise to anyone that higher education institutions are failing to fulfill their mission - to transfer know-how, and let students develop practical skills that are necessary to guarantee successful employment. The current education model faces many problems:

Education is expensive. Each year the price of education is growing. Students have to distribute their time between the studies and low-level jobs, still ending up with huge debts for their education.

The high price combined with the lack of incentives result in a decline of motivation to continue studies. Students need an extra push in the right direction. Recent years have seen the rise of fintech startups dedicated to student loan financing, but it is unavailable to the majority of the world. We think that the loan approach is morally wrong, and that everyone should have the opportunity to educate him/herself without the risk of defaulting on a huge debt.

Educational system so far offers mostly long-time incentives - the unspecified promise of future employment. However, educational institutions rarely analyze and link business needs to their curricula. The gap between the needs of employers and student knowledge already exists and is widening. This results in the need for business to provide the post-graduates with long-term and expensive training. We are building BitDegree to enable a direct and mutually beneficial communication between businesses and future employees.

Students lose motivation. One way to increase students' motivation is to use gamification in the educational process. A lot of small incentives make learning interesting. The use of games in the educational process attract the student at the beginning and retains attention throughout the game. Gamification can reduce problems caused by low concentration and it can also help more effective learning. Research has shown that no more than 20% of information is processed while reading, compared to 90% by using gamification⁴.

According to study, conducted by Pew Research Center and Elon University, the majority (53% of respondents) were confident that gamification will be very common in all areas of life by 2020⁵. Other research has shown that 75% of teachers believe that digital learning content will totally replace printed textbooks within the next 10 years⁶.

The constant and growing need for continuous learning. Thomas Picketty, the economist and author of "Capital in the 21st Century" concludes that across more than 300 years of history, the only predictable factor that drives individual earnings potential are "skills and knowledge". Today learning is a part of economic survival. However, education is not enough if we don't stay current, up to date, and continuously re-skilled in our professions (regardless of what they are). We fall behind. Our belief is that our smart incentives provide necessary, life-long learning possibilities.

2.4. Synthesis of the problem worth solving

The industry needs educated users as much as it needs skilled employees. Conventional education is taking too long to satisfy these demands. Looking from the user's perspective, there is a lack of a clear incentive, especially when the conventional education process is so ingrained in the culture. Digital industries such as recruiting and lead-generation are worth hundreds of billions each, but fail to be integrated properly to support education, even though there are clear synergies. The reasons

⁴ <http://voxmate.ru/>

⁵ <http://voxmate.ru/>

⁶ <https://www2.deloitte.com/>

for failure are numerous: the current non-digital nature of education, the biased legacy systems of personal contacts, reputation and trust issues, geographic and cultural challenges (if a global perspective were taken into account), etc. Educational institutions and digital industries do not align very well despite an inherent synergy. This synergy can be better realized by overcoming the obstacles of bias with neutral technology. It is essential to start with the most advanced area of the education sector – digital economy skill development – before tackling the more mainstream sectors of education. But our team is up to both challenges.

03. BITDEGREE: IT IS ALL ABOUT EDUCATION

We are proposing a digital incentivized studying platform as a new tool to grow the global tech talent pool. Companies in need of tech talent will provide financial incentives to students willing to participate in training courses and to develop their skills. Companies seeking to get people familiar with newly introduced technology or services, will provide financial incentives to students willing to spend time to learn and to try the company's offerings. By providing incentives, any company explicitly signals the demand for certain qualifications, or informs about knowledge and skills needed to effectively use newly introduced technology/products/services. People looking for new opportunities will learn new technologies, develop practical skills in demand, and get familiar with existing technological solutions provided by solution providers. Job seekers will enroll to subsidized courses to get more knowledge and to develop skills within selected technology topic. The course materials and learning process will be made interactive and in a highly engaging way by following field-proven gamification methods. Students will be able to communicate with other students and course mentors, to pose questions, and seek for more detailed explanations. All course material and progress assessment will be divided to small chunks in order to enable short-term effort in the reward cycle. In addition to subsidized course material, each student showing learning progress will be rewarded with platform Tokens. Companies providing incentives will be able to get in touch with students enrolled in subsidized courses, and possibly offer employment positions for good performers. Companies, offering to accept Tokens for services, will allow students to deepen newly acquired skills, while using commercial services offerings. Students will also be able to exchange Tokens on exchange platforms. The BitDegree platform will register progress of each student, and will provide ways the students can prove they overcome the challenge of developing and applying skills to solve problems. BitDegree will rely on Ethereum platform to enable incentives scheme and to store transparent record of all achievements made by students

THE PROPOSED BITDEGREE PLATFORM LABOR MARKET - EDUCATION MODEL

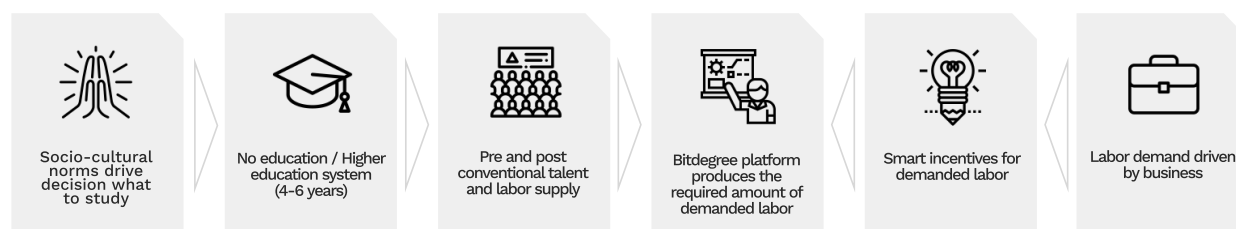


Figure 2. The proposed BitDegree education model

3.1. Introducing smart-incentives

Smart-incentive is an Ethereum blockchain based smart-contract ensuring exchange of value (tokens) between the *incentive creator* (sponsor) and the *incentive taker* (student). Incentive taker is committing

to perform *study effort* in order to receive the *incentive* (tokens). *The underwriter* of this smart-incentive is the BitDegree platform, which will provide *the proof of study effort verification*. Any company (like a potential employer or a technology/service provider), government institution, (like a school, job centers or prisons) and even ordinary citizens can become an incentive creator. Smart-incentives will be created by Incentive Creators who will provide sponsorship amount and define maximum number of applicants, date and time of when students can begin enrollment to course, when enrollment becomes unavailable, and how long the incentives are left available to enrolled students. The *Incentive Creator* will be able to set prerequisites for candidates, availability and intensity of incentives for selected regions or even specific areas e.g. Tampa, Florida, US. Incentive Takers will be able to lookup what kind of Study courses are available to them in their locality with respect to their track records of achievements. All student engagement with smart-incentive will leave tamper proof trail in the blockchain. The smart contract will provide assurance of incentive payment. The use of Token enables us to serve the economic incentives to any student in the world, which is not possible with flat money due to high transaction costs

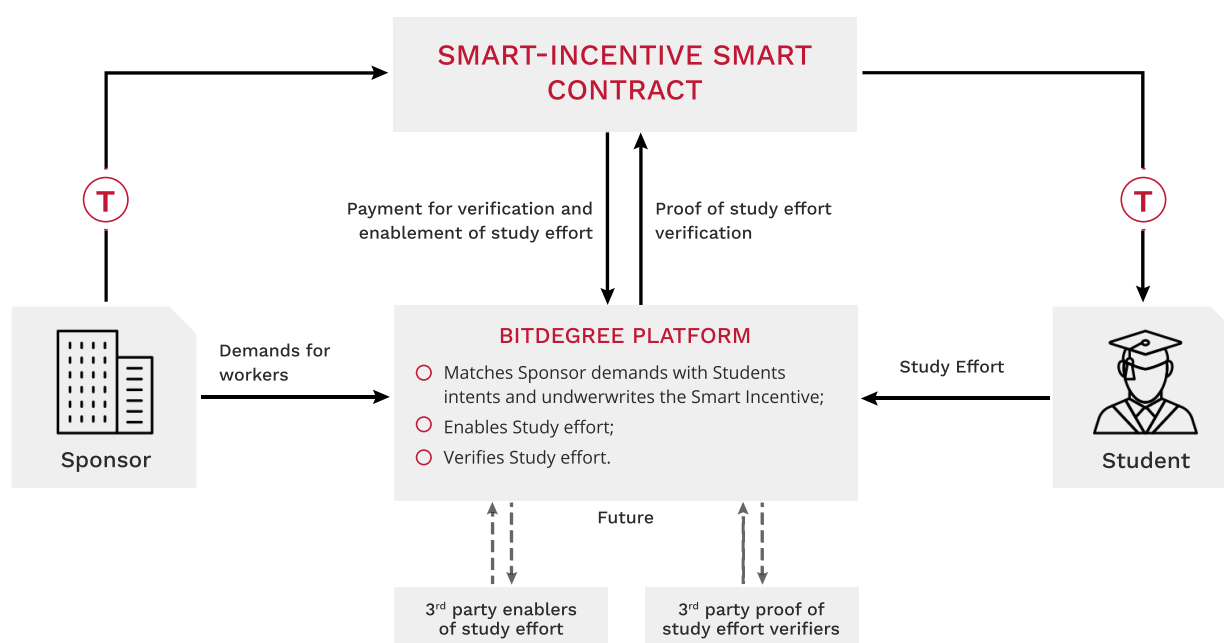


Figure 3. How Smart-incentives work

Proof of study efforts. The BitDegree platform will provide proof of study effort verification for all courses hosted on the platform. We will implement several familiar verification mechanisms like tests, problem solving, creative assignments and others. The majority of the verification mechanisms will be automated. In the future, for specific types of Study efforts, the BitDegree platform will open up to 3rd party Proof of Study effort verifiers, that will provide study effort assessment and will be incentivized to operate with compliance to quality of service requirements. The incentive to verifiers will be based on a feedback of perceived evaluation quality as experienced by Incentive Creators. Study efforts verification work will be compensated with a small part of the Incentive (tokens). Study

effort definition and enablement (preparing and running the course for the Student to study) is also rewarded with a part of the Incentive (tokens).

Study effort enablers (Course authors and mentors). We anticipate the case where 3rd parties will create part of study courses. In this case BitDegree will remain the Underwriter of smart-incentives. For example, Courses can be created by 3rd parties on demand or at their own discretion, like in Coursera, and the creators will earn tokens for usage and teaching of their courses. Once again, course material, mentorship, and verification will be measured and judged according to requirements of quality of service, and will be incentivized accordingly.

Chaining smart incentives together. Smart-incentives can be combined together to form a graph of mandatory and/or at least one in a predefined set of prerequisites, e.g., student enrolling to a frontend course should learn HTML and any of style setting alternatives (CSS/SASS/LESS/... as well as any of languages targeting EcmaScript/DOM UvaScript/TypeScript/Eim/..) to claim a final front-end capability reward. Smart-incentives can be applied to work of any length: a single action, a task, an extensive assignment, a degree. This enables continuous learning for big bodies of knowledge and different studying paths to achieve similar skillsets.

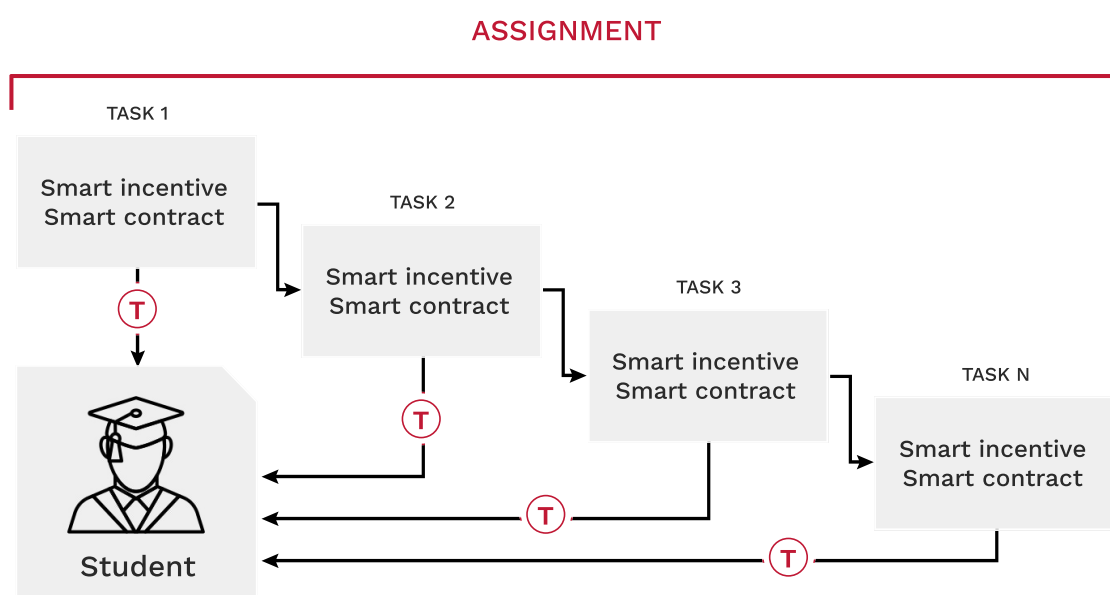


Figure 4. Example of serial chaining of smart-incentives

Smart-incentives types. We will work with gamification specialists to design various smart-incentives, i.e., rewards, incentive prizes, competitions, etc. We particularly believe in the Octalysis framework and will apply it to various aspects of BitDegree. In the future, the smart-incentives may be designed by 3rd parties, including Sponsors, to be tailored to the needs that we cannot foresee right now.

Smart-incentives have many favorable qualities and provide solutions to some of the problems we are aware of:

- they signal topics/skills in demand;
- they offer small rewards for small achievements and keep students engaged;
- they record all student achievements;
- they provide transparent records of how sponsorship was spent;
- they may offer rewards to course material creators;
- they may offer rewards to human evaluators assessing student's progress.

3.2. Gamification as a cornerstone of the platform design

Smart-incentives have great gamification properties. As smart-incentives can underwrite exceedingly small tasks. Nowadays, gamification is a key driver of a student's motivation. It helps students to actively engage in the process and makes learning as fun as playing computer games. Students become more productive because a small incentive is always near – like collecting XP points and raising your Level. The gaming industry has proven that this concept works effectively and brings financial success to entertainment products responsive to human conditions: stress induced by impatience, feelings of pride to be the first to achieve a goal or a need to belong with some group. We will tap into the same subliminal pathways that our students so effectively exercise each time they play computer games by implementing gamification through smart-incentives.

Yu-kai Chou defines gamification as “Human-Focused Design”, as the process takes into account humans' feelings along with reasons why people want to do certain things, or not. Yu-kai Chou elaborated a gamification framework called Octalysis, which represents eight Core Drives of people's motivations. The Octalysis framework is an octagon shape with the Drives on each side.

According to Yu-kai Chou Core, Drives of people's motivation are:

- 1. Epic Meaning & Calling.** If a person is engaged in a process and believes that it is the mission of great importance, he/she is ready to put a lot of effort, free time into pursuing this goal.
- 2. Development & Accomplishment.** People like to see the results of the performed activities, receive some bonuses or prizes for their accomplishments, and get to the leaders' list.
- 3. Empowerment of Creativity & Feedback.** None of the awards matters to a person if the goal can be easily obtained. Only those rewards matter, for which a person overcomes difficulties.
- 4. Ownership & Possession.** When a person possesses something, he/she instinctively tries to multiply the possessions and/or improve them.
- 5. Social Influence & Relatedness.** The fifth factor incorporates all social elements motivating people: mentorship, social acceptance, companionship, competition, and envy. When we see a

friend reach a high level in the game, we, as a rule, wish to catch up with and overtake him/her.

6. **Scarcity & Impatience.** The sixth factor that motivates a person is the desire to possess something simply because of its scarcity.
7. **Unpredictability & Curiosity.** Curiosity encourages people to continue progress, because they want to know what will be next.
8. **Loss & Avoidance.** The majority of people prefer to act immediately because of fear of losing the possibility forever.

The intelligent use of such drivers within the BitDegree platform, will enable us to not only attract new students, but will also to contribute towards sustaining the interest of existing users.

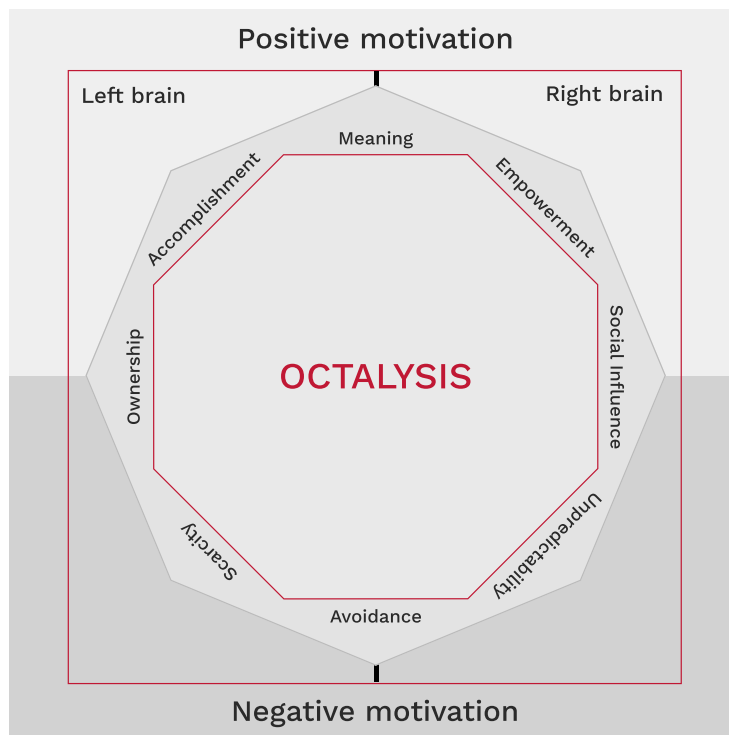


Figure 5. Octalysis framework

04. THE BITDEGREE PLATFORM

We love the idea of running BitDegree platform on decentralized blockchain fueled internet. We believe in decentralization and self-sustainable architectures, however, we see the need for centralization of certain aspects of the platform (at least in the beginning) in order to enable shorter development and deployment cycles and to ensure faster market adoption. After evaluating the current technology capabilities, such as blockstack.org we have decided to start with mature, conventional web technology. With time, we will aim to decentralize such things as course creation, course mentorship, verification of study, smart-incentives creation and others. At first, we want to make platform that is operational and we already have the basic implementations of some of the components in place up and running. Initially, the platform will provide minimal set of complete and functional services, essential to sustainability of the platform but we have a bold general plan for the future.

4.1. Roadmap and a Bold vision for the BitDegree platform

We practice agile development and therefore carefully plan for the immediate goals and draw general plans for the future according to the vision that we want to achieve. We share the motto of Jeff Bezos – “We are stubborn on vision but flexible on details”. We see at least 3 essential stages of platform development. We have clear plans for v1, however, what will happen in v2 and v3 will depend on the lessons learned in v1.

We follow core guiding principles for the platform design:

1. decentralization,
2. transparency,
3. inclusion,
4. sustainability,
5. growth,
6. disruption.

We will use these principles when deciding on the strategic direction of the platform and new functionalities.

ROADMAP

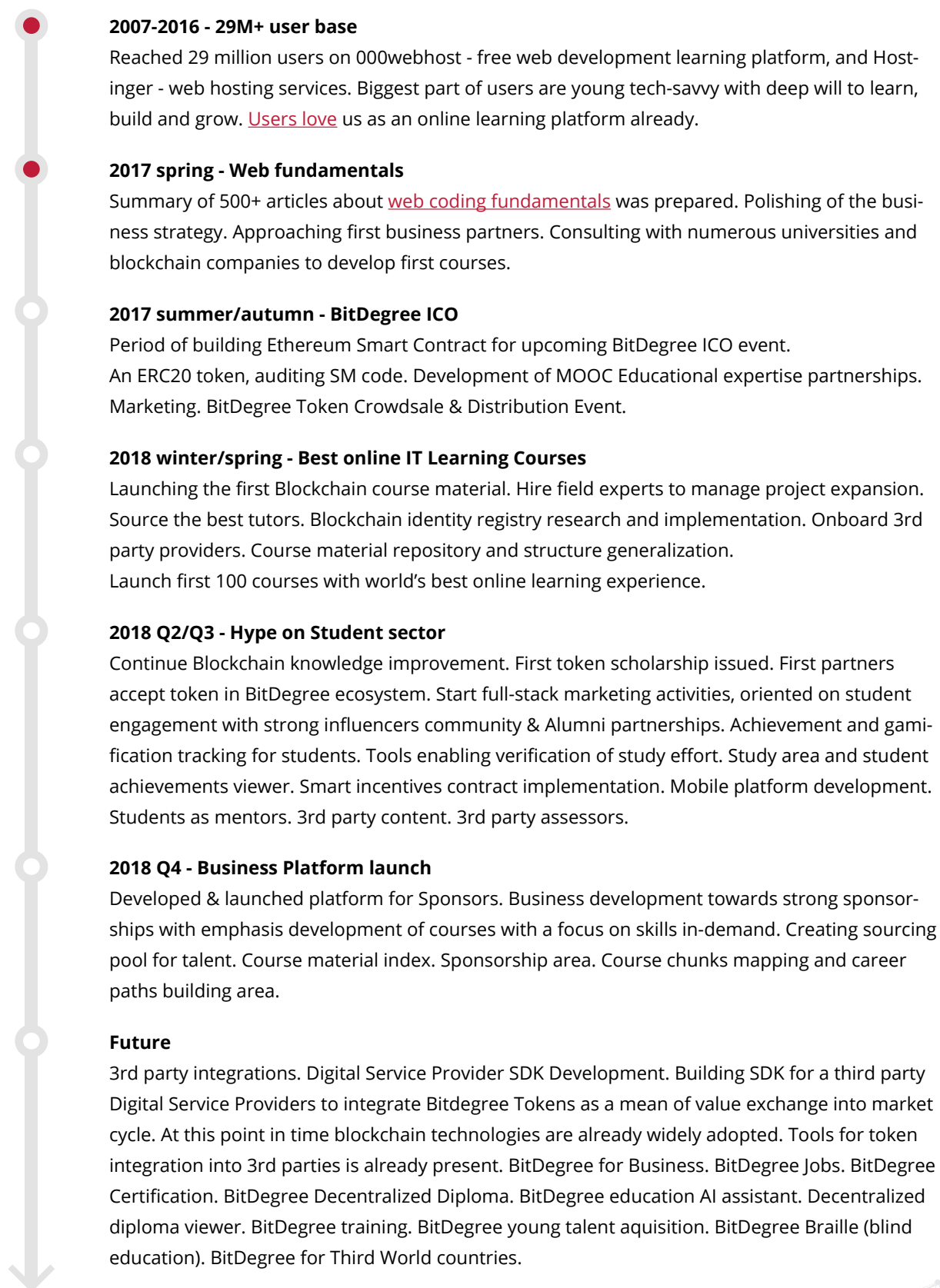


Figure 6. General plan for platform development

We anticipate that version 1 of the platform will provide a set of essential services: identity registry, course material repository, course material index, assessment tools, sponsorship area, study area, and student achievement viewer.

4.2. Identity registry

All platform users, willing to interact with the platform, will be able to create a password-derived cryptographic pseudo-identity. To enjoy full functionality of the platform, users will be able to use 3rd party service providers to link user's pseudo-identity to government issued identity and provide other information needed to become eligible for sponsored courses. We highly value personal privacy, and so we will enable students themselves to choose their position in a tradeoff of disclosing more personal information for becoming eligible to enroll in more subsidized courses. All student interactions with smart-incentives will only record pseudo-identities. The linked government issued identity will become viewable to sponsors when the student enrolls in a subsidized course, or to other 3rd parties, when the student shares a student achievement verification link with the above mentioned 3rd parties. Companies and other organizations will have to disclose their registered identities when providing sponsorship. Private citizens will be able to choose if they want to disclose their government issued identity when providing sponsorship.

4.3. Course material repository

Enrolling in a course will give students permission to use the course material hosted on the platform. Initially, course material will be created or licensed from content creators based on demand from sponsors. The course material will be created in small 'chunks' (similar to the scope of a single Wikipedia page). Each chunk will contain a summary of the content, tags for indexing, explanations of concepts and theory, descriptions of the ways theory can be applied to solve specific problems, examples of practical applications, challenges for students to apply theory in practice, and a criteria/dataset for automated verification of the understandings/skills developed. All chunks will have an associated knowledge base for frequently asked questions and answers, alternative explanations, and other user contributed material. Content chunks can be joined to form continuous paths of educational experience tailored to specific career positions and roles required by sponsors. Many positions and roles require similar, but slightly distinct, paths of learning experiences, thus, reuse of course materials will allow the reduction of overall costs of course material preparation. Additional learning paths can be cheaply assembled by reusing existing chunks and creating only the necessary additional pieces. Students can also benefit from reuse by skipping the assessment step in case they already successfully completed identical material while in pursuit of another path and, thus, only need a short memory refresh.

4.4. Course material index

The course material index is a database used to store and search chunk meta information and semantic links among all content chunks. There will be many content chunks available, and as a result finding something that will fit a student's career path could be difficult. While tailoring specific learning paths to our sponsors we will detect and name recurring learning paths to be reused later as guidance for additional paths. To make search more manageable, the semantic relations of chunks-to-paths and paths-to-paths will be recorded and continuously maintained. BitDegree will maintain public global naming space for chunks and paths but all sponsors will be able to define their own naming or import chunks and paths distinctly from our global naming space. Selected paths can be enhanced with conditions and imbued with smart-incentives. By immutably storing all publicly used paths, we can easily vary course material while retaining chunk reusability and the student achievement history that points to all chunks involved in course completion.

By managing chunks in a fashion resembling a semantic web, we gain more insights into what other, related concepts could be beneficial to students. We will be able to track which chunks are most commonly used in the critical paths of many courses and improve them more frequently compared to lesser used chunks. A chunk public index will need constant curating, which will be performed by BitDegree employees driven by recommendations and inputs from platform users.

4.5. Assessment tools

Fast and efficient self-assessment is crucial to maintaining motivation. We will generate individualized chunk-focused or path-focused tests for student self-assessment based on testing datasets provided in each chunk. For programming tasks that can be automatically evaluated, this may include executable code to test the code written by students. Automated assessment will recommend which topics/chunks to repeat to improve performance. Many assignment types require demonstration of creative thinking and have many known and unknown methods of solving problems given to students.

ASSESSMENT TOOLS

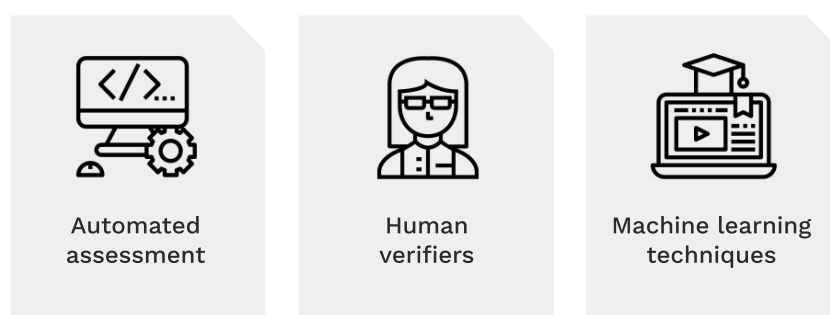


Figure 7. Course assignment assessment tools

Human evaluation is necessary for those types of assignments and we are looking for economically balanced ways to incorporate human verifiers (at first, course mentors) into assessment.

The assessment process will also try to detect cheating by applying machine learning techniques to track exhibited student behavior, like the amount of time taken to become familiar with material and complete exercises, the tendency to ask questions and not wait for the reply before trying to assess his skills, and therewith, infer a risk rating. The rigor and scrutiny applied to assessment will depend on the inferred risk rating. Each assessment will work as a challenge response mechanism, and a positive evaluation will result in a signed achievement certificate, which later will be used to claim the smart-incentive reward from the smart-contract.

4.6. Sponsorship area

Identified and authenticated sponsors will get access to the platform's sponsorship area. They will be able to use a guided process to express their needs in the form of campaigns. An example campaign would encode information on the budget available (X tokens worth 8000 USD), pre-defined satisfactory results (e.g., prepare two candidates for unfilled front-end positions), the qualification goals for candidates in the form of learning paths successfully completed (e.g., developers with demonstrated experience of using angular2 to implement a web shopping cart application). Another campaign example would encode the budget allowance, limits on number of students enrolling and topics (e.g., covering the use of the sponsor's product) being sponsored. We are looking into many ways sponsors will be able to define their satisfactory results, constrain students' eligibility, establish rules of splitting-off sponsorship amounts to reward joining campaigns (enrolling in courses), and the use of dynamic pricing principles (within the budget scope), depending on the results of the ongoing campaign. Sponsors will be able to increase the budget and targeted students for a campaign at any time. The campaign will be publicly announced after it has been defined and planned, and the budget paid. The platform will try to match students that have expressed interest in topics covered by sponsored courses and will notify them in advance of a slightly delayed public announcement to other qualified students. Given the sufficient budget allocation to help mentor new talent, and an openly disclosed compensation for any positions being offered, the students with achievements matching the required qualifications, and willing to receive position offers will be notified about the newly opened positions. Sponsors will be able to track overall student enrollment and individual progress of each enrolled student. Automatically triggered notifications will be sent to sponsors when campaign results are being partially or fully matched, (i.e., one or several students having successfully completed all assessments, proving their qualifications for open positions)..

4.7. Study area

Identified and authenticated students will be authorized to access the study area of the BitDegree platform. During the first visit to the area, students will be asked to create a student profile. They

will be asked to disclose some personal information, to establish their privacy settings, to rank study fields and topics in order of interest, and to select ways they can be contacted by the platform. Personal information includes mandatory information, like government issued identity (name, surname), date of birth, location of residence, and it may include optional factors like native language, proficiency in foreign languages, and other personal factors. Privacy settings will allow the restriction of when, how, and which personal information may be disclosed to other parties. For example, some sponsorships may only be made available to residents of certain areas, therefore the platform will not offer enrollment to students who prefer to hide their location of residence. Students will be asked how they can be reached (by email, Facebook, text message, etc.) in the event that new sponsored studies, matching their interests would become available, or new employment positions matching their achievements become available, plus all other listed and unlisted cases. Any case can be enabled or disabled individually at the student's discretion. After completing their profiles students will be able to look up available sponsored study courses and read about rewards and perks (like job offers for the first or top achievers) associated with successful participation and completion of a sponsored course. Students can access selected course material by enrolling in a particular course. The enrolment process may include answering some questions, such as how much time a student has available to engage a selected course. This will allow sponsors to estimate the time-to-completion of the course. Students will access course material and complete self-assessment exercises whenever they feel ready for it. Students are able to communicate to other students or course mentors if they are unable to answer any questions. Sponsors will be tracking progress of students enrolled in courses and will be able to initiate a dialog with any enrolled student. Students will get notified when such communication is desired by a sponsor and will be given means to accept and continue the dialogue.

4.8. Student achievements viewer

As part of our prospective vision we see BitDegree being used as the main platform to attract talent, yet old-fashioned ways may continue to be in use. When responding to old-fashioned job applications, BitDegree students will be able to generate and include a link to their achievements viewer page on BitDegree showing a summary of their achievements made on the BitDegree platform. Students will be able to select what achievements they want to be visible to the viewers, as some may not be needed for a specific employer or job application. Every prospective employer can receive a distinct and custom-tailored link. The achievement viewer will display a verified government issued student identity, and courses taken and successfully completed without disclosing the student's pseudoidentity. Although no direct link between pseudo-identity and government issued identity will be disclosed on the achievements viewer, this may not prevent highly motivated employers from looking for correlations of disclosed achievements and matching achievements on the blockchain to reveal the pseudo-identity and, thus, all other undisclosed achievements on the platform.

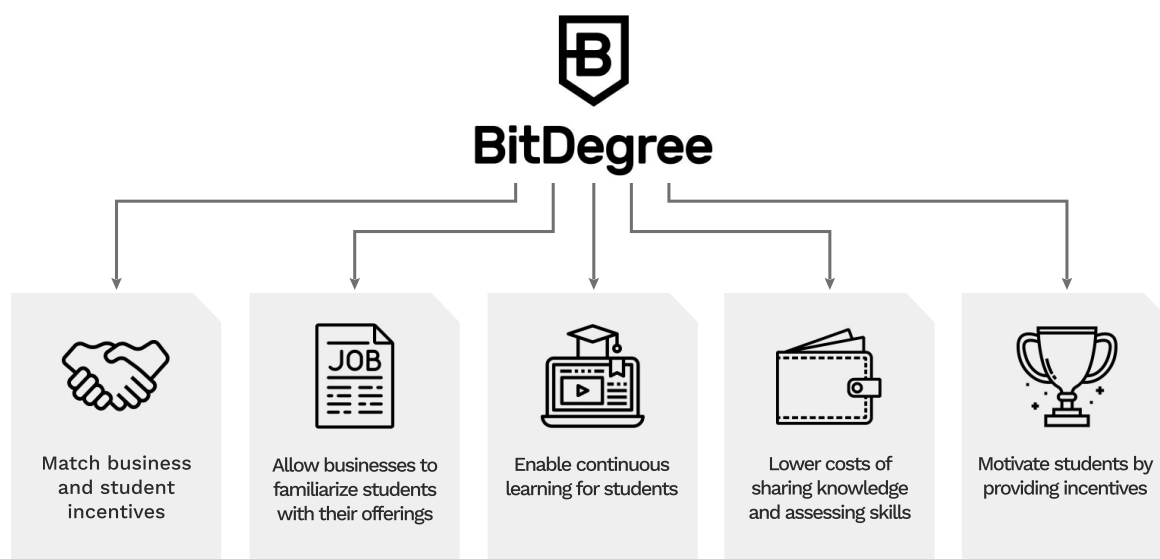


Figure 8. Bitdegree platform benefits

Version 1 of BitDegree platform will provide solutions to most of the problems we seek to solve:

- It will match business and student incentives;
- It will allow businesses to familiarize students with their offerings;
- It will enable opportunistic, continuous learning for people striving to gain new desired skills and knowledge;
- It will lower costs of sharing the knowledge and assessing knowledge/skills;
- It will help motivate students to continue with their study efforts and will provide incentives to those progressing forward.

In the future, large and detailed data sets of information about BitDegree users will allow for useful big data analysis revealing career guidance and employment-fit matchmaking. Imagine students' being able to completely by-pass the conventional education system and be guided to their most profitable and/or exciting career options based on how well they are studying micro-courses. Moreover, we could steer students toward course choices that guarantee employment right after the completion. BitDegree will become an essential tool to unlock this unprecedented potential and to disrupt outdated education systems. This is the future that we believe in and will do our best to bring to reality.

In the scope of **Version 2** of the BitDegree platform we will increase the choices of available content, introduce localized version of course material, and scale mentorship and assessment functions. We would like to include more human touch and guidance in the learning process. Only open and flourishing ecosystems can grow beyond their original limitations, and opening up the platform will be a primary objective for us.

4.9. Inclusion of third party course material

We aim to establish a live ecosystem of content creators contributing to the success of the platform. Third parties will be able to contribute to the scope of a single chunk, a series of progressive chunks or even a complete course covering a specific area of expertise. Contributors could register their fields of expertise and receive requests to create content for new or trending topics and/or improve existing content in exchange for compensation. Unsolicited opportunistic content creation could also help cover less trendy but nonetheless important topics (as in a COBOL developer course or OpenVMS administrator training material).

Contributors will have to adhere to contribution guidelines for course material to be accepted. The guidelines will cover acceptable forms of knowledge transfer methods supported by our platform, requirements for datasets used to assess completion, conflict resolution processes, acceptable content licensing terms, and other details.

We are looking into secure schemes of providing fair and reasonable incentives to contributors.

Conventional learning platforms with standard rewards schemes to contributors have certain weaknesses that can be abused. In such abusive schemes, giving rewards directly to content providers does not really contribute benefits to students. Testing and research into aligning the interests of all parties involved will be needed. We would like to explore ways to measure how helpful 3rd party-supplied material is to learning a subject during our testing phases via implicit (passive observation) feedback from students and A/B testing of the same content from different content providers. We believe that rewards collected for continuously providing contributions to our platform could become a source of steady income for active contributors.

4.10. Third party assessors

Intricate and complex topics require more flexible and responsive assessment that only humans can provide (at least today). Standard testing practices that give lots of false negatives by assessing only minor details and overlooking the broader picture of the persona may not reveal talented students. That is why a second opinion from a human assessor may provide a great opportunity to keep students from dropping out. As more and more content from different fields of science and technology become available on the platform, the inevitable need for human assessors will become evident. Some advanced qualifications may even require 3rd party assessors to verify knowledge/skills in a controlled environment and in the physical presence of the student. Many 3rd parties provide professional assessment services and we will tabs on the market for existing solutions.

4.11. Students as mentors

Most of us have had the enlightening experience of finally understanding some complex topic with

just a little push and help from another student or a master of the craft, when books and blogs failed to deliver the final missing piece of the whole picture. Allowing distinguished students to mentor other students can greatly benefit them both. To help someone else understand new concepts, one must look for several ways to present such concepts and their relationships to other concepts. This practice deepens a mentor's understanding and sometimes leads to new insights. Different deep perspectives delivered by a mentor can shorten the time it takes for a student to grasp the concept and its utility for solving problems. We will be researching technological solutions for students to solicit help from mentors and enable seamless mentor-student communication to achieve that 'Ah-Ha!' moment. Furthermore, we will seek suitable incentive models to apply to the circumstance.

The path to the **3rd Version** of the platform will lead to even broader content available to students as a result of strategic partnerships with other education platforms.

4.12. Integration with 3rd party education platforms

Integration with 3rd party education platforms will provide mutual benefits to BitDegree and its partners. BitDegree would mine the data of recurring sponsorship from major employers to match students with the best studying options available, not limited to just the content available on the BitDegree platform. We would seek assessors that are independent of 3rd party platforms to organize intermediate/ final assessments.

05. TOKEN CYCLE AND BENEFITS TO PARTIES INVOLVED

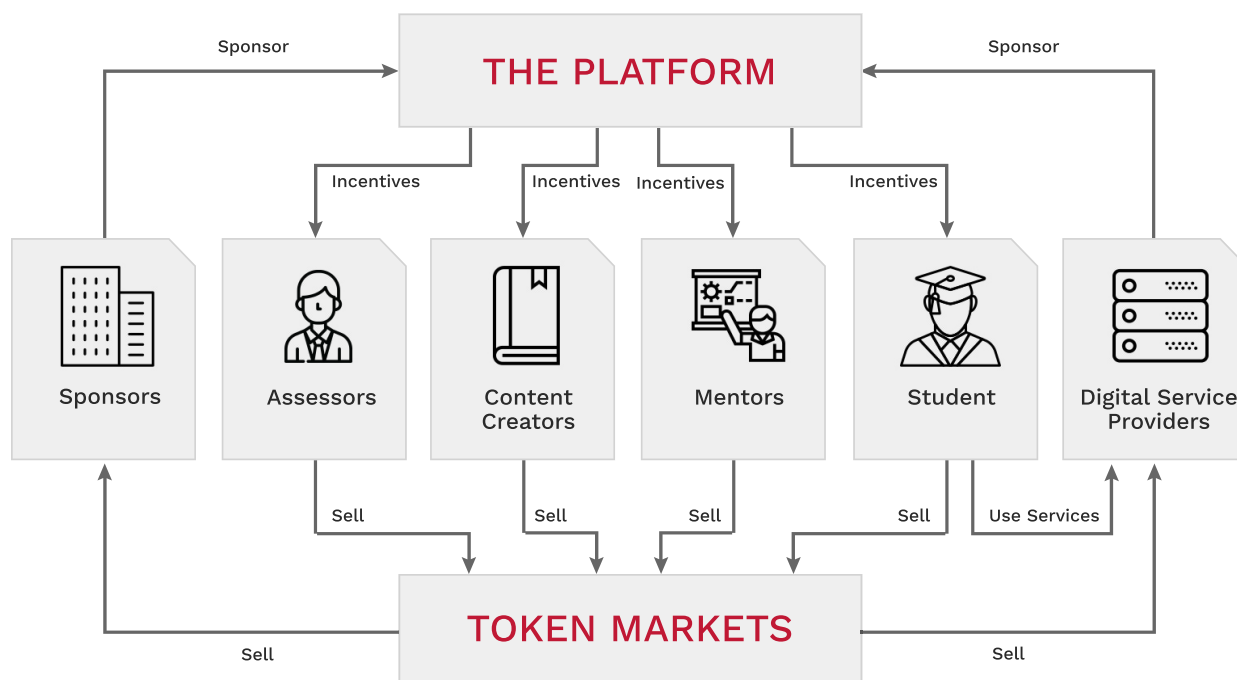


Figure 9. Token flow

Sponsors are the main economic fuel for sustainable BitDegree economy. The economic incentive for Sponsors to buy BitDegree tokens is the targeted platform for the employer branding and recruitment of tech talent. Corporate and private employers, HR companies, government and non-government organizations, other talent acquisition and talent growth structures/agents will be buying tokens to initiate, fund and create courses, establish scholarships and other rewards targeting exact topics and areas of study. For the spent tokens, Sponsors will be able find, train and recruit talent. Digital service providers, who want to familiarize users with their products, would buy tokens to sponsor the students willing to spend time to learn the products offered. By providing sponsorship to BitDegree platform and accepting BitDegree tokens IAAS/SAAS and other digital service providers will be able to attract freshly minted technology power users. The BitDegree platform will spend tokens to incentivize students, content providers, assessors, mentors and to cover marketing and other operational expenses.

Content providers, assessors and mentors will receive compensation (in a form of tokens) for their contributions to the platform and for helping to organize educational process. We anticipate most of the compensations received will be sold in token markets.

People looking for new opportunities or jobs will study on the platform. **Students** will receive tokens as rewards for choosing to study topics in demand and for continuing to show learning progress in a

form of tokens. Good performers are likely to receive offers to join sponsoring companies. Students may also accept offers to familiarize themselves with services provided by **digital service providers** for a fee (in a form of tokens). Students will be exchanging tokens for the services and products of digital service providers, spend tokens on the BitDegree.org platform (for premium or non-sponsored courses, funding of courses on topics of interest, etc.) and exchange tokens to fiat on token markets.

The amount spent by a U.S. company to fill an open position approaches 4,000 USD and the entire recruitment market is over 200 billion USD worldwide. We do not doubt the fungibility of the BitDegree Token.

06. WHY BITDEGREE IS SUPERIOR TO ITS ALTERNATIVES

There are many well established companies providing remote learning experience like Coursera, Khan Academy, EdX, CodeCademy, FutureLearn, XuetangX, Udacity and others. These companies run platforms to provide access to content, assess student knowledge, enable student to mentor communication. Each company has its take on how to cover its running expenses, for example: by being supported by consortium of universities, providing paid course or paid assessment, providing company and product branding. By being pioneers in the new field, those companies burned through huge amounts of investments to learn about things that does work together and things that does not fit well. Sadly, after becoming very popular, they become too big to risk introducing radically new ideas to get funded, introducing new forms of training material, or experimenting with new communication patterns. The current success of these companies is staggering and allows to measure the size of market we are about to enter. Top 10 of these companies have in excess of 110 million cumulative registered users with some companies showing revenue in excess of 60M USD.

We are coming late to the market. Coming late to the market allows us to study history and attempts of each company to test ideas, techniques and to create user centric focused workflows. Being small allows us to rapidly test new ideas and ways we respond to the needs of our students, sponsors and contributors. We studied most of well-established remote education providers by enrolling to courses and learned best practices used but also experienced many difficulties. We analyzed availability and price of certification, availability of scholarship, value provided to scholarship sponsors and a level of gamification employed in educational process.





	 BitDegree	 codecademy	 coursera	 edX
COURSES FREE OR PAID?	Free	Free	Paid	Mostly free
CERTIFICATES	BitDegree ID	For CodeCademy Pro Intensive only	Yes, but paid	Yes, but paid
SCHOLARSHIPS/ EARN TO LEARN	Earn to learn	No scholarship available	For individual courses only	For individual courses only
VALUE TO SPONSORS	<ul style="list-style-type: none"> • Receive high-skilled workers • Advertise their products and services 	<ul style="list-style-type: none"> • Receive high-skilled workers 	<ul style="list-style-type: none"> • Increase number of users • Advertise their products and services 	<ul style="list-style-type: none"> • Increase number of users • Advertise their products and services
GAMIFICATION	Extensive	Little	None	None
BLOCKCHAIN BASED	Yes	No	No	No

Figure 10. Bit Degree advantages matrix

Although gamification techniques are well tested and proven to help motivate consumers in other fields it is still seldom used by existing competitors, who stick to more old style, tried and true academic approaches. We will assemble the current best practices of providing free access to teaching material and augment it with learning process gamification, human mentorship, free and verifiable assessment, financial incentives to students and employer-student matching capabilities. Non of our competitors employs all of these features.

We are not a big threat to existing market players as the education market is expanding wildly and can accommodate additional players. Each player brings exclusive features meant to attract customers, but strategic partnerships are common in the exchange of training material. However, with time we believe our gamification and incentives based model will show its benefits and lead to capturing a significant share of the remote education market.

6.1. The market potential of BitDegree

It is easy for everyone to observe the rapid expansion of the remote education and e-learning markets. We believe that with the new incentivized learning model, BitDegree brings the next wave of e-learning adoption, which will spur the growth of the user base. We estimate the user base to double every two years..

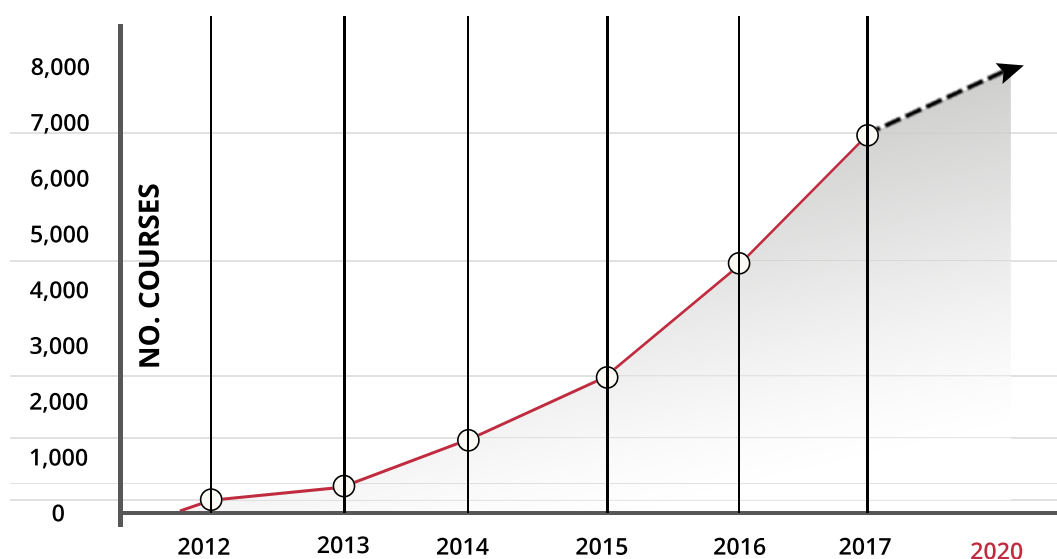


Figure 11. The rise of the MOOCs courses. (Source: Class Central)

2016 WORLDWIDE REVENUE FOR SELF-PACED E-LEARNING PRODUCTS AND SERVICES BY REGION (IN US\$ MILLIONS)

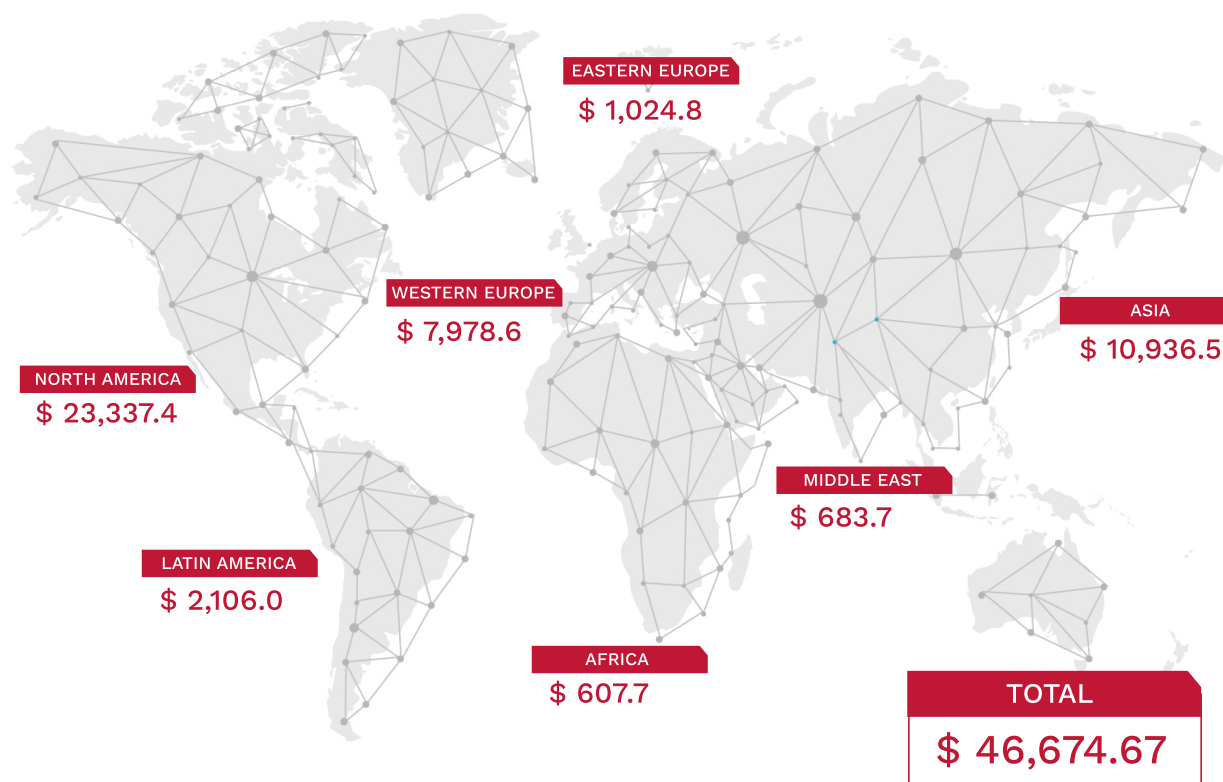


Figure 12. Worldwide revenue for self-paced e-learning

By aligning the interests of potential employers and students using the education platform we enter the talent sourcing market as well. There is a growing demand for digital professionals, which in the EU alone is expected to reach 9 million by 2020, while globally this figure is expected to be 3-5 million higher. This huge demand and short supply is the reason why in the US, it costs on average 4000 USD to fill a vacancy.

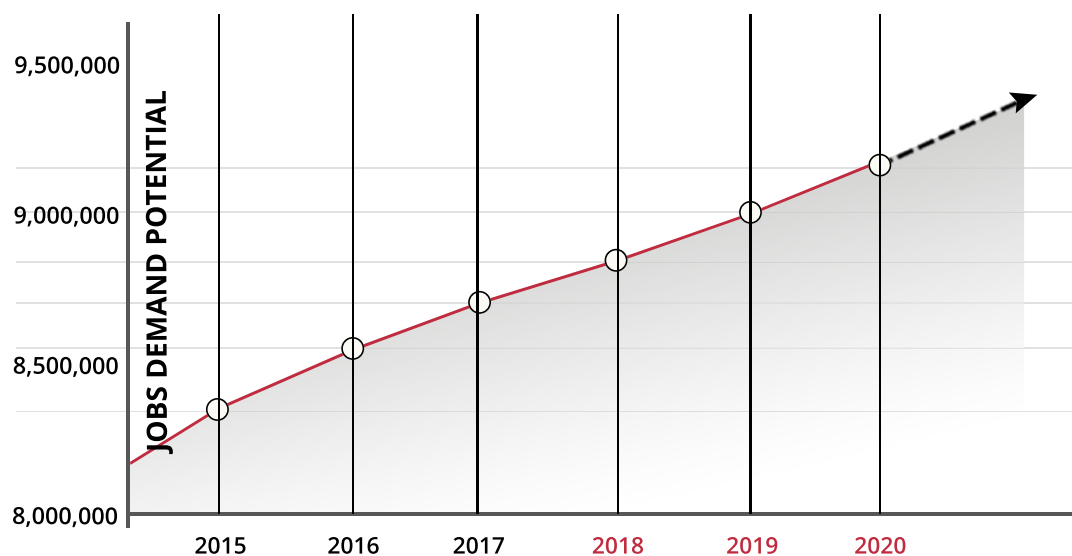


Figure 13. Rise of the demand for digital professionals (vacancies) in the EU. (Source: IT professional and Innovation leadership labour market data and forecast for EU28)

In fact, we expect a severe shortfall in digital talent around the world by 2020, when according to a Gartner study, 30% of tech jobs will be unfilled, due to digital talent shortfalls.

We believe that these trends warrant and confirm BitDegree's business model and that there is clear demand for our value proposition.

DIGITAL STAFFING GAPS (NUMBER OF EMPLOYEES)

JOB PROFILES	2016	2017	2018	2019	2020	2021
Front-end developer	20	-4	-7	-9	-26	-82
Digital Product Manager	4	-1	-2	-12	-73	-63
Solution Architect	5	0	-1	-1	-1	-2
Back-End Developer	15	-5	-27	-9	-45	-52
UX/UI Designer	30	-15	-62	-62	-71	-74

-75	-50	-25	-15	-5	5	10	15	20	25	>25
Shortfall (%)										Surplus (%)

Figure 14. Digital staffing gaps. (Source: BCG analysis)

07. TOKEN LAUNCH

BitDegree will issue an ERC20 compatible token, which will be used to provide incentives to students and contributors of the platform.

The sale of BitDegree tokens will be final and non-refundable. The BitDegree will not be responsible for any loss of BitDegree tokens or situations making it impossible to access BitDegree tokens, which may result from any actions or omissions of the user or any person undertaking to acquire BitDegree tokens, as well as in case of hacker attacks.

We plan to offer anyone sharing our vision to contribute to the development of BitDegree by buying BitDegree tokens during the Initial Coin Offering event, which will be held on Q4, 2017. BitDegree goal is to raise a minimum of 5 million USD and to stop accepting contributions when 25-30 million USD will be collected. Some of the numbers may change due to ETH/USD exchange rate volatility, but the following numbers are best estimates as of September, 2017.

- **Maximum financing:**
30,000 ETH - may change due to exchange rate changes;
- **Minimum financing:**
550 ETH - may change due to exchange rate changes;
- **Exchange rate:**
1 ETH = 10,000 Bitdegree Tokens - may change with ETH exchange rates;
- **Token contract address:**
Will be published **only** on website bitdegree.org 48hrs before the crowdsale launch date;
- **Launch date and time:**
Date to be announced soon. Block number will be published on website. Dates may be prone to change;
- **Token launch time-frame:**
30 days.
- **Token launch completion:**
Token launch will end when either the maximum number of ETH is raised or 30 days have passed. If less than the minimum of ETHs are raised, ETH can be retrieved by holders of BitDegree Token;
- **Contributors sending ETH to BitDegree Smart Contract address will immediately receive tokens.**

Token Distribution

- **BitDegree foundation:** 66 million (locked for 360 days);
- **Scholarships pool:** 165 million;
- **Token available to public at launch:** 336,6 million;;
- **Team:** 66 million (locked for 720 days);
- **Advisors / Partners:** 13,2 million (locked for 160 days);
- **Bounties :** 13,2 million;
- **Tokens in total:** 660 million.

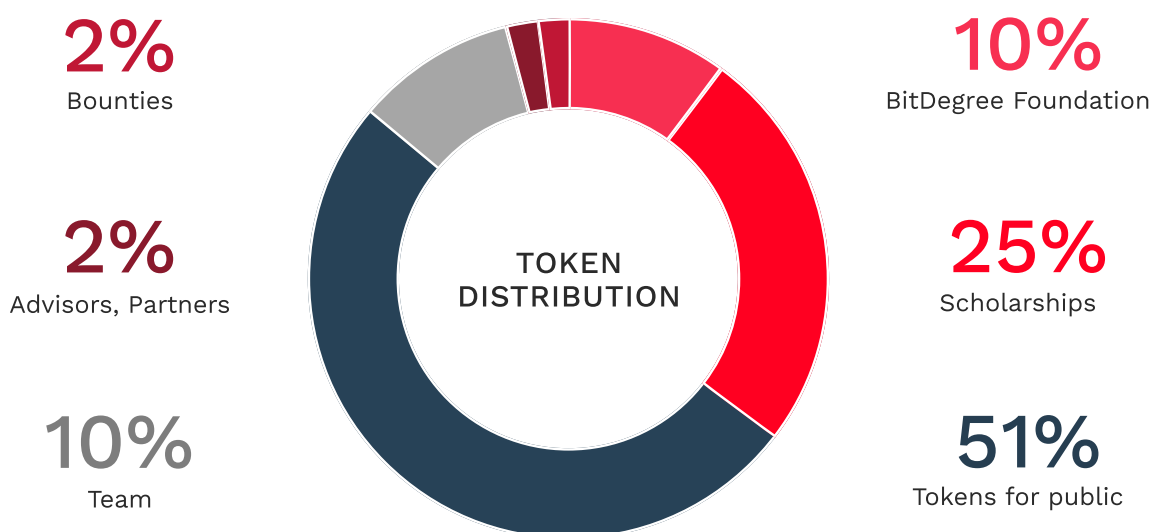


Figure 15. Token distribution doughnut chart

Scholarships.

Scholarships pool will be used to incentivize users to participate in the BitDegree ecosystem in the early days of its operation. No new tokens will be created once the user growth pool is exhausted.

Budget Allocation

- **BitDegree Platform: 30% of budget.**

The team consists of over 10 engineers [DS8] and MOOC experts fulfilling the key roles in the company – sales, marketing, legal and others. This financing allows the rollout and operations of the BitDegree platform;

- **Courses development: 30% of budget.**

These funds will be directed at third-party education professionals, offering online courses and content production;;

- **Marketing and business development: 25% of budget.**

Marketing will focus on expanding awareness and adoption of the BitDegree platform and the platform solution among users, publishers and advertisers. This also includes the growth and maintenance of the world-wide community. Marketing, growth-hacking, PR, partnerships, affiliate programs and more;;

- **Operational: 8% of budget.**

Consists of BitDegree legal, security, accounting and other associated administration costs;

- **Security: 2% of budget.**

This part of the budget is set-aside for auditing software.

- **Reserve: 5% of budget.**

This part of the budget is set-aside for unforeseen expenditure.

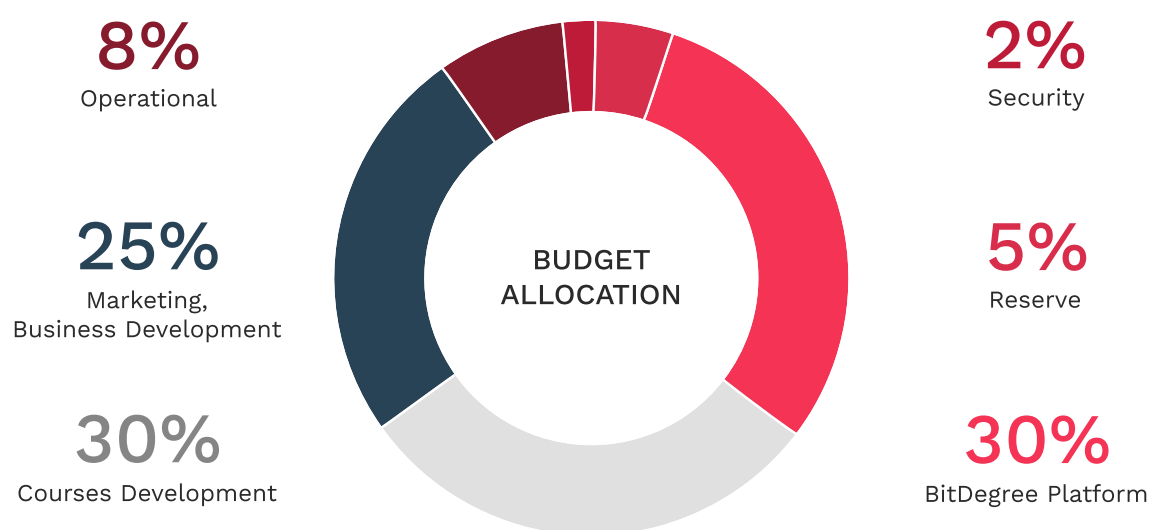


Figure 16. Budget allocation chart

08. BITDEGREE TEAM

The need for the BitDegree solution was recognized by the team behind Hostinger - one of the top global web hosting providers. Hostinger works to enable millions of people around the globe to unlock the power of Internet by giving them tools to learn, create and grow online. The most popular Hostinger services can be reached online at:

www.hostinger.com, www.000webhost.com, www.hostinger.es, www.hostinger.com.br,
www.hostinger.ru, www.hostinger.co.id, www.hostinger.fr.

Marketing of BitDegree will start from the existing 29 million user base of Hostinger and 000webhost - loyal, web-passionate, learning and innovation open, worldwide community. Our confidence in BitDegree success comes from more than 10 years of experience in analyzing the needs and challenges faced by the millions of Hostinger customers worldwide.

8.1. People behind BitDegree

The team is comprised of multi-skilled professionals that have worked with each other in various capacities and became friends. This joins the project that everyone in the team is highly passionate about. This is the time when everyone dreams big and goes big. Most of the team has already worked together scaling solutions that reached millions of users and stumbled upon the need to educate them, whereas some others have worked on the educational initiatives experience, which can be directly applied to BitDegree.

Andrius Putna, *CEO, co-founder*

11 years in software engineering. Blockchain advocate. Person behind the success of 000webhost - world's first and biggest free cloud hosting platform designed for learning, testing and experimenting. Hostinger product architect.

Danielius Stasiulis, *CBO, co-founder*

Head of Startup Division at Civitta (7 years) - the leading management consulting firm in Eastern Europe. Advised 300+ startups and worked with many startup programs, including Berkeley Skydeck in Silicon Valley. He focuses on ICO and blockchain-based business models.

Ervinas Rimdeika, *CLO, co-founder*

Ervinas is a FinTech fan and has extensive practice in related fields of corporate, intellectual property and business transaction law questions as well. He worked not only at a few well-known law firms, but also at one of the largest company's group in Lithuania and Baltic States. In previous years Ervinas Rimdeika was a member of one of the top raising Baltics FinTech startups and reached impressive results, where Lithuanian Supreme Court changed case-law and formed new interpretation rules on financial lease and other matters. Clients and colleagues especially value Ervinas Rimdeika for deep

legal knowledge, critical and strategic thinking, in-depth analysis of the problems as well as rational approach.

Rio Asatiani, *CMO, co-founder*

With more than 14 years of experience in effective customer acquisition, working with new brands and startup launches, Rio is a growth-hacking guru & Google Certified Partner who led 000webhost and Hostinger to an international success in more than 40 countries by attracting 29+ millions of new users. He joined the BitDegree project having a strong vision in innovative acquisition channels and solid experience in growth-hacking. Rio ensures the success of BitDegree on an international level.

8.2. Advisors

Jeff Burton, *Serial Entrepreneur, co-founder of Electronic Arts*

Global technology executive, keynote speaker, and a Silicon Valley veteran, Jeff was a founding team member of Electronic Arts, where he oversaw the global expansion of its operations. Jeff has high-level connections in Silicon Valley and around the world that he is using to help startups like BitDegree. Jeff developed U C Berkeley's Skydeck startup accelerator and is currently involved in helping startups around the world to grow and scale into the Silicon Valley. Jeff is an experienced, dedicated contributor who believes in BitDegree and wants to help.

Roberto Santana, *Product and Strategy Advisor, Former Senior Manager at Coursera*

Entrepreneur and Former Product Management Growth Lead at Coursera. Roberto played a role in helping Coursera scale to a global level and acquire over 27 million learners worldwide. Roberto is Stanford MBA with 3 engineering degrees in computer science and design. His exceptional engineering and technical knowledge has led him to scale several startups by managing the project and business development, including San Francisco-based Zendesk, where he helped grow number of paying customers by 60%. Prior to his work in the Valley, Roberto was a Senior Engineer with Shell, where he led cross-functional team responsible for the delivery of products that accounted for \$400M in refinery revenues.

Maurice De Hond, *Steve JobsSchool Founder, Personalized Learning Advisor*

A successful entrepreneur and founder of Steve JobsSchool - a modern elementary school concept designed to see each child as an individual and nurture him based on his strengths and interests. This learning model quickly became successful and is already adopted in more than 35 schools in the Netherlands. Being the pioneer of innovative learning ensures the implementation of modern educational solutions on the Bitdegree platform on the long term that will establish a solid foundation

for IT passionate people to reach their full potential.

James K. Scarborough, *Stanford University PhD., Gamification Advisor*

Currently a candidate for PhD. at Stanford University, James main focus is to deeply engage players for the purpose of increasing workplace, classroom, and similar forms of individual and team-based productivity. He is currently involved in projects assessing the effects of real social interaction in virtual spaces concerning primarily energy efficiency behaviors, gender and culture specific responses, and the physiological impact of social interactions in goal-oriented game environments. Having a profound experience in gamification and working with companies that created such games as Tetris, Civilization, Falcon Flight Simulator, led him to joining the BitDegree team and assures a deeply engaging environment of the platform on the long term.

Arnas Stuopelis, *COO, co-founder*

Arnas is the CEO of Hostinger. Prior to taking the role of the CEO, for 6 years Arnas was responsible for business development at Hostinger. He successfully expanded Hostinger on a global level as well as played an important role when creating one of the most successful web hosting brands in Indonesia - Niagahoster.co.id. With his profound entrepreneurship skills and a solid experience in business development, Arnas knows how to scale a project to global success..

Ričardas Pocius, *Technical advisor*

Ricardas is a passionate distributed systems engineer who enjoys sharing his experience and knowledge with others. Determined to keep magic out of the systems. Organizer of Erlang workshop/meetup in Vilnius,LT.

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