Project of Building a Collaborative Hands-on Working Facility (Makerspace) in the Czech Republic

Rron Beqiri

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Degree, First Name and Surname:	**Rron Beqiri**
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Thesis Guidelines:

Introduction

Define the objectives and the application methods used in the Master thesis.

I. **Theoretical part**

- **Compile the theoretical information about Makerspaces.**

II. **Practical part**

- **Complete the analysis of current external factors.**
- **Prepare the project of a new Makerspace in the Czech Republic.**
- **Submit the project to risk and cost analysis.**

Conclusion

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Thesis Supervisor: **doc. Ing. Michal Pilík, Ph.D.**
Department of Management and Marketing

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doc. Ing. David Tuček, Ph.D.
Dean

L.S.

UNIVERZITA TOMÁŠE BATI VE ZLÍNĚ
Fakulta managementu a ekonomiky

doc. Ing. Pavla Staňková, Ph.D.
Head of Department

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Abstraktní

Lidé neustále hledají proměny svých myšlenek na podniky. ale nejčastějším problémem mezi lidmi je nedostatek zdrojů a zařízení. Makerspace zahrnují zařízení, která jsou velmi drahá, tj. laserové řezačky nebo 3D tiskárny. Makerspace jsou fyzickými místy pro komunitu, kde členové vytvářejí a staví s využitím zařízení, které nejsou dosažitelné pouze na náklady jednotlivce.

Cílem této studie je prozkoumat stávající literaturu v makrospachách a vývoj jevů v průběhu času. Pokračuje v potvrzování potřeby vytváření prostoru v Zlíně a vytváření podrobného návrhu projektu, kde praktičtí pracovníci a výzkumní pracovníci budou sloužit jako základna. na závěr projekt zdůrazňuje řízení času, odhad nákladů a analýzu rizik.

Klíčová slova: makerspaces, podnikání, do-it-yourself, učení dělat, kreativní prostory.

Abstract

To date, individuals are constantly aiming at turning their ideas into businesses. However, the most common problem among these individuals is the lack of resources and facilities. In one hand, resources in these cases include equipment which otherwise is very expensive for one person alone, i.e. laser cutters or 3D Printers. Makerspaces are physical locations with a community, where its members make and build using equipment which otherwise is unattainable at the cost of an individual alone.

This study aims to explore the extant literature in makerspaces and the evolution of the phenomena over time. It goes further in validating the need of a makerspace in Zlin and building a detailed project proposal, which for practitioners and researchers in the field will serve as a baseline guide. Last but not least, the project highlights the time management, cost estimation and risk analysis.

Keywords: makerspaces, entrepreneurship, do-it-yourself, learning by doing, creative spaces.

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Table of Contents

Introduction

The introductory chapter includes the background of the study, which familiarizes the reader with the definition of makerspaces. Further, the discussion follows with the outline of practical and theoretical contribution of the thesis. Finally, the research disposition outline will be explained so that the reader will have a better understanding of the content of the study.

Background

Interest in entrepreneurial activities has marked a rise worldwide, with individuals constantly looking to turn their ideas into businesses. However, the most common problem among these individuals is the lack of resources and facilities. Resources include access to expensive equipment, which for an individual at the very early stages of an idea is very expensive to bear the costs (Hatch, 2014). The mentioned resources include but are not limited to laser cutters, 3D printers, IT equipment for coding etc. Based on the market needs, locations which otherwise known as makerspaces started to develop. Makerspaces provide access to space, physical equipment as well as overall support for entrepreneurs in developing their ideas. The customers of a makerspace include individuals of any age and background; as the entrepreneurship is no longer related to specific age or a specific group of people. For the purpose of this thesis, customers are categorized into three groups: students who will benefit from the space and mentorship. Wish access to a wide community, students can develop skills and gain experience on the basis of trial-error and shared knowledge. The second group includes individuals who simply enjoy making and building, and the third group includes organizations who would like to offer the services and access to makerspace under the employee benefit package.

Makerspaces come in different forms and shapes, placing a special emphasis to the idea of sharing among like-minded people and creating (Hatch, 2014). Ladies Social Society established in 1873 marks the very first prints on the existence of makerspaces (American Libraries Magazine, 2013). The Ladies Social Society was established in New York, United States of America by local women who met for tea, shared common interests in sewing, knitting and quilting. Makerspaces can be found in universities, public schools, libraries, and mainly warehouses (Britton, 2012). According to Burke (2014), 2005 marks the establishment of the Make Magazine. The establishment of the

magazine serves as a re-affirmation of makerspaces as a viable business and service. The Make Magazine was followed with the organization of the very first Maker Fair in 2006 (McCue, 2011). Since then Maker Fair, has grown and takes place in countries across Europe, Asia and United States. Currently, there are more than 1500 makerspaces operating throughout the world (Hatch, 2014).

Practical and Theoretical Contribution

From the practical perspective, the establishment of a makerspace in Zlin is of high relevance for all the interrelated stakeholders, such as Tomas Bata University in general, students, and individuals who enjoy sharing knowledge and building. The benefit in establishing a makerspace in Zlin, lies in promoting academic achievement since students will work in small groups; enhance competition which tends to lead to high quality problem solving skills. Last but not least, cooperation among team members will promote interpersonal skills, improvement of social support and fostering of self-esteem.

From the theoretical perspective, the concept of makerspaces is relatively a new concept; therefore, still in need of studies which will contribute to the extant research. In one hand, the concept of business incubators, which makerspaces often times are compared to, are heavily researched, but limited to the resources they offer. On the other hand, research is scarce when it comes to the establishment of makerspaces, process of building a makerspace and the benefit of the community. This practice based research aims to fill the gap by providing an overview on how to establish a makerspace. Furthermore, it offers an overview of the research conducted to date. Last but not least, this thesis will provide a good basis for researcher who are aiming to study the effect of makerspaces into society and economy as a whole, but also individuals or groups who are planning on establishing a makerspace within their community.

Research Disposition Outline

In order to guide the reader on the content of the study, a disposition outline of the study is structured below:

Chapter 1: Introduction – This chapter aims to familiarize the reader with the concept of makerspaces by providing background information on the development of the notion of makerspaces. It goes further by elaborating the practical and theoretical contribution of the thesis. Furthermore, in order to guide the reader on the content of the study, it provides a research disposition outline.

Chapter 2: Theory –This chapter focusses on explaining the literature choices as well as philosophical stances in terms of ontology, epistemology and axiology. Additionally, it outlines the research approach, preconceptions, researcher's motivation as well as presents the approach in which the literature is focused. Furthermore literature review, demonstrates the theories and concepts which are crucial to the topic being explored.

Chapter 3: Business Model – This chapter elaborated the main concepts in building a business model, including, value proposition, mission, vision, cost and sustainability, external environment factors and risk analysis.

Chapter 4: Developing the Location – This chapter serves as a practical guide for all individuals aiming at developing a makerspace. It includes details on project overview, project requirements and deliverables, project organization, project scope, work breakdown structure, resource and time management, cost estimation analysis, cash flow analysis, risk analysis, project control and project closure

Chapter 5: Conclusion - The last chapter provides the concluding remarks of the thesis, which were extracted based on the current literature and practical process of the development of a makerspace in Zlín.

Theory

Theoretical Methodology

This chapter focusses on explaining the literature choices as well as philosophical stances in terms of ontology, epistemology and axiology. Additionally, it outlines the research approach, preconceptions, researcher's motivation as well as presents the approach in which the literature is focused.

Research Philosophy

Research philosophy offers an understanding on how the researcher views the world and knowledge (Saunders et al, 2012). Researchers argue that philosophical stances should not be mixed with different lines of thought; however, Saunders et al., (2012) argues that in practice one may hold different views yet apply other inconsistent research methods and strategies. As such, chances of developing interesting theories increase and no research method has a competitive advantage over the other (Malterud, 2016).

Ontological Considerations

Ontology questions the beliefs and assumptions that the researcher has in relation to the nature of the reality; thus, the social setting they belong (Long et al., 2000). In simple terms, once can argue that ontology is concerned with the situation in the real world (Bryman & Bell, 2011). Ontology is known for its two perspectives: i) Objectivism and ii) Constructivism (Saunders et al., 2012). Objectivism depicts the reality as external from all the occurring phenomenon's; thus, promoting the idea that social actors do not have a say in constructing the reality of environment which they habitat (Saunders et al., 2012). In practice, one should note that objectivism refers to robust environments in an organizational setting.

In contrary, constructivism views the reality as a constantly changing environment; therefore, highly dependent on the surrounding social actors (Saunders et al., 2012; Yin, 2013). In practice, constructivism is closely related to today's environment where social actors play a crucial role in building and influencing the society through social interaction (Yin, 2013).

The concept of maker and entrepreneurial culture in general requires a deep understanding of the topic at hand; since, throughout time, the value of makerspaces has surpassed the idea from mere crafting locations to becoming collaborative spaces with the aim of knowledge-sharing.

For the purpose of this practice-based research, the researcher views the reality within the concept of constructivism considering that the concept of maker and entrepreneurial culture is highly subjective due to the fact that different social actors are involved. In terms of making and learning notions, the philosophy of education views learning as a personal endeavor requiring the student to initiate the learning process (Yin, 2013). Additionally, according to Lindgren and Packendorff (2011) and Yin (2013) entrepreneurship is seen as a socially shaped field, being constructed and re-constructed constantly, leading to the developed of new theories and practices from the involved social actors.

Epistemological Considerations

Epistemology is concerned with what is viewed as acceptable knowledge in a field (Saunders et al., 2012). The social setting cannot be viewed and studied with the same procedures and measures as the natural sciences (Bryman & Bell, 2011). Three main epistemological stances agreed among academia and practitioners are i) Positivism, ii) Realism and iii) Interpretivism (Saunders et al., 2012).

Positivist followers believe that knowledge can be gained by studying observable phenomena and employing tools and techniques which are used by natural scientist (Bryman & Bell, 2011). Positivism is known for following rules, procedures and regulations (Long et al., 2000). As such the researcher avoids taking any stances on the topic to avoid any biases in the research.
Similarly, to positivism, realism is highly correlated to scientific enquires (Saunders et al., 2012). Realism argues that objects are independent from the human mind; arguing that reality is what our senses show us (Saunders et al., 2012).

On the contrary, interpretivism is a more flexible method which requires the involvement of the researcher (Yin, 2013). The researcher must know the cause of the problem or have knowledge of

the phenomena at hand, to understand the context of the situation (Goldkhul, 2012; Yin, 2013). Interpretivism is used when the researcher is aiming at building new theories; therefore, it all starts from observations which along the way lead to constructive conclusions (Yin, 2013). Being that this thesis is a practice-based research carried to gain new knowledge partly by the means of practice and on the outcomes of this practice, one might argue that interpretivism is the appropriate epistemological stance. Practice-based research is heavily contingent on the views of all interrelated key actors (Yin, 2013).

Axiological Considerations

Axiology is also referred to as the "theory of values" which studies judgments about values (Saunders et al., 2012). The author is aware of the ethical perspective as well as the responsibility required, because, I see myself, as a co-constructor of the current maker movement within the field of entrepreneurship (Lindgren & Packendorff, 2011). I do believe that the findings will have a practical contribution to in the process of knowledge building regarding the process of building a makerspace. The choices of philosophical approaches demonstrate that I am value-bounded with the topic itself.

1.1. Research Approach

1.2. Preconceptions

Motivation for Research

Research suggests that moving away from the traditional teaching style which focuses primarily on the theoretical aspect will have a positive effect on the learning process of the individual as well as will introduce new ways of thinking (Weinmann, 2016,). To facilitate this change in the mindset, makerspaces have been introduced around the world. The makerspace is a physical location where people gather to share resources and knowledge as well as build networks. The idea of sharing a location and resources which otherwise are impossible to be attained by an individual alone is revolutionizing the way that teaching and learning is being approached.

Need for Makerspace in Zlin

- The city of Zlin is known for its "creating culture"; therefore, it needs to move into the direction where it melds some of the most recent high-tech advances.

- The city of Zlin lacks a collaborative area which gives people a chance to move further by providing access to tools, work with line-minded people, mentors, contacts as well as university connections.
- City of Zlin needs a place where students from Tomas Bata University can apply what they learn during their studies.

Last but not least, ZlínMakerspace will gradually become a collaborative space with knowledge-sharing communities. Its attention will not only be merely a tool sharing centre, but, will shift to a inventions catalyst.

Approach to Literature Selection

Literature review is conducted to increase the theoretical level of the thesis but also provide practical understanding of the topic, as well as identify potential new research areas within the topic. As such, this will aid the understanding of the work carried in the past, but also aid the process of understanding knowledge gaps. The topic being investigated should be overlooked from various perspectives, including contradicting assumptions. The inclusion of a broad range of ideas will ensure the validity of the research (Eisendardt, 1989). This thesis combines the concepts of Makerspaces and Entrepreneurship; therefore, literature conducted in the both spheres will be taken into consideration. However, one should be aware of the fact that both fields are relatively new in the academic field; therefore, a lack of research is obvious. As such, a practice based research was decided to be conducted.

For the purpose of this study, books, scientific journals, viewpoints and editorials within the field of Entrepreneurship and Innovation were taken into consideration. However, the lack of scientific literature on makerspaces forced the inclusion of studies from i.e. Innovation Centers, which were found online.

To initiate the research process, general broad key words were identified: Makerspaces and Entrepreneurship. According to Harvard (2007), keywords ease the process of refining the research results in the field. To further narrow down the research further keyword were generated. In one

hand, for the topic of Makerspace, the list included: open lab, learning by doing, social and creative spaces, do-it-yourself. On the other hand, Entrepreneurship was followed with a list of following keywords: innovation, start-ups, flexible, informal environment. The literature was extracted from different databased including: Scopus, Science Direct, EBSCO and Research Gate. Last but not least, sources which were not specifically related to makerspaces and entrepreneurship but have a side impact on the topic, were taken into consideration.

Literature Review

Theoretical background demonstrates the understanding of the researcher on the theories and concepts which are crucial to the topic being explored.

Introduction

The concept of "Makerspace" has been initially coined in the early 2000s. However, in practice makerspaces have been gaining recognition throughout the world just recently. Special emphasis is placed on exploring how makerspaces are shifting the way how teaching and learning is processed. Makerspaces are found in schools, universities, libraries and community public areas (Radjou and Prabhu, 2015). The main idea behind a makerspace lies in sharing of facilities and tools which otherwise are unattainable by an individual alone. The tools usually include laser cutters, 3D printers, routers, coding equipment etc.

Eventhough the term makerspace is new, similar sharing facilities have existed in some way and shape even in the past. As a matter of fact, the first makers' movement is thought to date back in 1873 when the Gowanda Ladies Social Society gathered to quilt, sew, socialize and talk about books (American Libraries Magazine, 2013) to date, according to Hatch (2014) there are over 1500 makerspaces operating throughout the world.

Makerspace Definition

Being that the origin of makerpaces is heavily related to practice and outside the framework of academia, little research has been conducted to date. The concept and the idea behind makerspaces is not new (Massey et al., 2017); however, other words are more common in describing the

phenomena (Hatch, 2014). Other common words which replace the name makerspace are: hackerspace, creative space, fab lab or make lab (Barrow, 2001); however, one should note that all notions have the maker movement as its recognition base (Hatch, 2014). Hackerspaces are considered to be the predecessors of makerspaces. In hackerspaces, people share ideas and knowledge, thus, promoting community knowledge sharing environment; which, also aligns with the makerspace's core values of making and sharing. According to Baichtal (2011), a hackerspace is a physical location which is visited and used by the community to gather and share knowledge but also build and make things. Both hackerspaces and recently makerspaces are located into spaces which are easily accessible by the community such as social centres, public schools or university campuses, and warehouses (Radjou and Prabhu, 2015). As such one can conclude that the same characteristics and features are for both, hackerspaces and makerspaces; therefore, over time, many hackerspaces have transformed fully into a makerspace.

In an attempt to introduce makerspaces as a recognized notion, Fleming (2015) defined makerspaces as a metaphor for special learning through making, play and exploring. Hatch (2014) describes a makerspace as a "centre or workspace where like-minded people get together to make things". However, Fleming's and Hatch's definitions have been criticized for narrowing and restricting the concept itself (Katz, 1992). In light of the aforementioned criticism, The Educause (2013) further defined a makerspace as a "physical location where people gather to share resources and knowledge, work on projects, network and build. They are primarily places for technological experimentation, hardware development, and idea prototyping". Contrary to the previously presented definitions of makerspaces, the concept presented by The Educause (2013) takes into consideration four important factors:

i. Access to a physical location which is reachable by all its members;
ii. Access to community among the members, which results into networking and knowledge sharing;
iii. Access to resources otherwise unattainable by individuals alone;
iv. Hands on experience which allows the members to operate on tools and build.

In support of this definition, a growing consensus has been reached among practitioners and makers on the definition of the makerspaces. Namely that makerspaces are physical locations with

a community, where its members make and build by using equipment which otherwise is unattainable at the cost of an individual (The Mentor Makerspace Group, 2013).

Makerspace Types

All makerspaces share the core principles of sharing and making. The entire idea is built around the community, innovation, empowerment, and creativity; however, in practice makerspaces exist in different shapes and forms (Massey et al., 2017; Radjou and Prabhu, 2015). Their existence depends on their focus, goals, customer segmentation and the membership forms (Barrow, 2001). Each space caters to the needs of its community members; therefore, leading to different types of makerspaces (Massey et al., 2017). Makerspaces are different from one another, yet at the same time are similar when it comes to the funding model. The main revenue stream of a makerspace is the membership structure. The membership structure has proven successful in covering the renting/building costs, equipment costs as well personnel costs. Its customers, on the other hand or otherwise known as members have different backgrounds; thus, being entrepreneurs, artists, engineers, students or basically anyone who enjoys building things and sharing ideas with like-minded peers (Anderson, 2012; Barrow, 2001; Massey et al., 2017; Radjou and Prabhu, 2015). According to Hatch (2014) currently there are more than 1500 makerspaces operating throughout the world; however, the most commonly known are Artisan's Asylum, Makelab, Hacklab and Techshop.

Makerspaces are also found within institutional setups including schools, libraries and universities (Anderson, 2012; Radjou and Prabhu, 2015). In general, the idea behind building a makerspace within an educational institution is to add the practical component to what is being taught during classes (Massey et al., 2017). Universities with a technical background are prone to introducing makerspaces around their environment; however, one should bear in mind that usually makerspaces within institutions lack the idea of freedom which characterized all other makerspaces (Braun & Vaughan, 2009; Massey et al., 2017). This occurs due the rigor of the education system that has characterized our society throughout years (Massey et al., 2017).

Makerspace Setup

While all makerspaces differ from each other when it comes to implementation and to the actual physical building, according to the Mentor Makerspace Group (2013), there are certain requirements which are a must to be fulfilled during the set-up stage of the makerspace. Requirements include: i) sufficient funding, ii) available location, iii) access to equipment; iv) available to personnel who is trained and has knowledge in operating as well as use of equipment; and last but not least v) safety rules and regulations (Makerspace, 2012).

Most of makerspaces throughout the world serve as a resource facility, used for different contexts. The uses include training and working on robotics, automation, mechanics, 3D printing, CNC Tools (Radjou and Prabhu, 2015). For younger generations, makerspaces also provide access to subjects focused in coding through Arduino, LittleBits, Raspberry Pi (Hatch, 2014; Makerspace, 2012). In practice, depending on the purpose of the equipment, makerspaces are divided into areas i.e. artisans area, mechanics area, wood processing area etc (Mentor Makerspace Group, 2013). Last but not least, all makespaces operate in based on guiding safety principles due to the risk involved with the use of tools and equipment. Accidents may happen if proper safety measures are not taken into consideration; therefore, for each member is crucial to pass the safety orientation training for each tool that they are going to use (Hatch, 2014).

Historical development of makerspaces

Looking down the origin lane of makerspaces, one will not be able to identify when the phenomenon started to occur. However, two historical phases may be identified: the emerging period covering years from 1800s until 1990s and the evolution period covering years between 1990s until today.

Emerging Period

Makerspaces come in different forms and shapes, tailored to the main goal that the community has. One should note that special emphasis has been always placed in the idea of sharing, making and caring (Massey et al., 2017; Radjou and Prabhu, 2015). As such, based on these very principles, one will be able to identify the first traces of a makerspace, if one may called it as such. According to the American Libraries Magazine (2013), in 1873 the Ladies Social Society was

established in New York. The society was formed by local women who met for tea, shared a common interest in sewing, knitting and quilting. The society has been subject to name changes in 1877 being recognized as Ladies Library Association, and in 1900 re-named as the Gowanda Free Library.

The Canadian Handicrafts Guild founded in Montreal, Canada in 1906 is another example of an association involved in handicrafts (McLeod, 1999). The main objective of the association was to support and encourage crafts in Canada. Similarly to today's marketspaces core objectives, the Canadian Handicrafts Guild encouraged like-minded people to work together and share knowledge (Alfoldy, 2005). The Canadian Handicrafts Guild has led to the creation of the very first and only craft's museum in Canada, the Manitoba Crafts Museum and Library. The museum was founded in 1930s after the establishment of the Canadian Handicrafts Branch in Manitoba, Canada. According to the American Libraries Magazine (2013) the list goes further by entering also the Nebraska Library Commission which was founded in 1960s.

The idea of shared entities, which provide physical resources for its community, started with the establishment of business incubators (Adkins, 2002; Barrow, 2001; Branstad, 2010). Business incubators serve as an entity, which offer physical, as well as knowledge resources for its members (Adkins, 2002; Barrow, 2001; Hughes et al., 2007). Branstad (2007) and Adkins (2002) argue that business incubators are a great benefit for the members because they foster formal and informal relations, knowledge sharing as well as the exchange of networks. As such, the three basic principles characterizing a business incubator according to McAdam and McAdam (2006) are technology transfer, entrepreneurship promotion and promotion of cutting-edge research. The idea of entrepreneurs who are still at the very early stages of creating a business, sharing the same space and resources, increases the chances of the entrepreneur as well as business success (Adkins, 2002; Barrow, 2001; Rothaermel and Thursby, 2005). When discussing the resources offered within an incubator once can argue that most of business incubators are limited to office space (Adkins, 2002; McAdam and McAdam, 2006); even though a consensus among researchers in the field as well as practitioners has been reached in agreeing that business incubators which offer also strong networking skills have a higher success rate (Adkins, 2002; Barrow, 2001; Hansen et al., 2000). The extant literature argues that services offered in a business incubator are limited to

administrative services, business assistance as well as networking. (Adkins, 2002; Hackett and Dilts, 2004; Bergek and Norman, 2008). As such, the need for a more creative set-up of a space similar to a business incubator, but not limited to space, networking and business assistance was identified (Barrow, 2001; Radjou and Prabhu, 2015). The birth of collaborative working spaces, which aim to promote learning, sharing, as well as making, is identified with the establishment of Fablabs, Techshop and Hackerspace (Radjou and Prabhu, 2015).

According to the Fab Charter (2012) the Fablab is a global network of local labs, which enable invention by providing access to tools for digital fabrication. The core principle of Fablabs focuses in the ability of capabilities of making anything. Fablab network provides its members with operational, educational, technical as well as logistical assistance.

Techshop was a do-it-yourself working space, which had branches across the United States of America. Similarly, to the existing makerspaces today, the main revenue stream for Techshop were membership fees. It should be noted that Techshop had a location also on the campus of Arizona State University in the ASU Chandler Innovation Centre. As such, it is considered one of the very first institutions of this set-up to be infused in a university environment (Radjou and Prabhu, 2015). In this context, the main aim was to empower and promote the DYI culture among students (Radjou and Prabhu, 2015). Techshop workspace was accessible to everyone older than 16 years old with a valid membership, no matter the educational background or experience, including entrepreneurs, artists, tinkers or anyone who showed the slightest interest in making (Radjou and Prabhu, 2015). However, on November 2017, Techshop announced its immediate closure and announced bankruptcy. All Techshop locations outside of the United States of America remain open and will not be effected.

1960s also marked the raise of hackerspaces which back in the days were associated with the process of smashing the system (Morozov, 2014). According to the Oxford Dictionary (2018) definition of a hackerspace is “a place in which people with an interest in computing or technology can gather and work on projects while sharing ideas, equipment and knowledge”. According to Baichtal (2011) hackerspaces are physical locations where people gather to share computing resources and knowledge as well as build things. Hackerspaces can be found in universities, public

schools, social centres as well as warehouse spaces, which is also seen as the ideal location for a hackerspace (Raison, 2010). In contrast to the original connotation at their early founding phase, hackerspaces, are now seen as a place where people interested in computing and technology are gathered together to share ideas, equipment and knowledge (Richterich, 2016). The first hakerspace known throughout the world was built in Berlin, Germany in 1981.

The Evolution Period

Even though makerspaces have existed in different forms as long as people have been making things and have been constantly needing access to tools and equipment which otherwise is unattainable due to the high costs for individuals alone, the concept of makerspaces has pinned its mark with the establishment of the Make Magazine in 2005 (Burke, 2014). The Make Magazine is issued by Maker Media in San Francisco, California. As the magazine boomed among the DYI and entrepreneurial community, Maker Media launched the very first Maker Fair in San Mateo County in 2006 (McCue, 2011). The launch of the Make Magazine and Maker Fair led to the recognition of maker's movement and the concept of makerspaces throughout the world. To date, Maker Fair is hosted in countries across Europe, Asia and United States of America.

Business Model

Overview

Oftentimes, individuals with the entrepreneur-spirit lack access to resources, facilities and expert advisors to make their ideas a reality. Generally, this demographic includes entrepreneurs, freelancers, students and even professionals. ZlínMakerspace is a makerspace in Zlín that caters to their needs by providing access to equipment, space and mentors. This will enable its members to develop, design, and prototype innovative products and services with additional support along the way. Beyond that, ZlínMakerspace empowers a collaborative culture through the "hands-on" approach and maker community.

Value Proposition

ZlínMakerspace objective is to deliver entrepreneurial-driven and proactive individuals with access to facilities, tools and expertise. It offers a safe environment and an inspirational community of creative and knowledgeable individuals who share the common goal of turning dreams into realities. ZlínMakerspace eliminates the fear of trial and error by encouraging and supporting continued development and hands-on learning.

Competitive Advantage

ZlínMakerspace is comprised of three main areas: (i) cognITive room; (ii) ARTisan room; and (iii) MYShop. The cognITive room will consist of high-tech equipment and related software. The ARTisan room will include tools and materials for hand-made projects. MYShop is the unique selling point with two purposes; first to be an all-in-one stop shop for members and second, to sell products created by members at ZlínMakerspace to support their business (Makerspace, 2012). Additionally, ZlínMakerspace offers recycling services and mentorship programs. An all-inclusive space, and the only tool you need to make your place.

Key to Success

- Identify what the community wants and what are they missing in their activities.
- Find partners i.e. universities, incubators and mentors who want to collaborate with ZlínMakerspace (Maughan, 2014).
- Establish partnerships to secure access to a pool of potential users.

Target Customers

Individuals: Individuals will join to gain access to the space and resources required for the realization of their specific goals, whether it be the creation of Minimum Viable Products (MVP) or simply executing professional activities. They also benefit from full-range support in starting and running their business.

Students: Student membership provides students with the space and resources to make tangible portfolio pieces which may be related to their studies or employment purposes. Students can benefit from mentorship and gaining experience on the basis of trial-and-error, with access to ZlínMakerspace's community of members, partners and staff.

Corporate: Corporate members will be able to complete an array of tasks for their organization without incurring extensive costs in fixed assets that are specific to individual projects. Corporate membership is transferable between individuals of one organization, thus allowing a multitude of employees to benefit from it.

Funding and Sustainability Models

ZlínMakerspace requires a start-up investment of: €150,000.00. ZlínMakerspace's revenue sources will include (Calvalcanti, 2013):

- Membership fees
- Workshops and Events
- Venue Rental
- MYShop (margin and percentage)
- Online Shop (www.ZlínMakerspace.com)

Mission, Vision and Values

Mission Statement

ZlínMakerspace's mission is to *provide a creative and innovative space.*

The value proposition is aligned with the strategic vision; ZlínMakerspace aims to provide self-directed and entrepreneurial-driven individuals with access to tools, facilities and expert advisors, otherwise unattainable during humble beginnings. It offers a safe environment and an inspirational community of creative and knowledgeable individuals who share the common goal of turning dreams into realities. When finding the means to do so is difficult, ZlínMakerspace eradicates the fear of trial and error by encouraging and supporting continued development and hands-on learning. ZlínMakerspace's brand is also a significant portion of the strategic vision as it encompasses their unique approach.

Vision

In line with the company's mission is the vision which states:

A place where everyone has a decent space to create.

Values

ZlínMakerspace has three core values which drive its business practice:

1. **Creativity** – Unleashing the potential of the mind
2. **Innovation** – Turning dreams into realities
3. **Collaboration** – Encouraging collective genius

Value Proposition

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realities. ZlínMakerspace eliminates the fear of trial and error by encouraging and supporting continued development and hands-on learning.

How the Business Model Works

There is a clear rise in the need for entrepreneurial endeavors, particularly in developing economies where their microeconomic successes produce a trickle-up effect on the countries macroeconomic situation. As a result, the interest in entrepreneurial activities has also increased worldwide, with more and more individuals looking to turn their great ideas into big business. However, oftentimes individuals with the entrepreneurial spirit lack access to resources and facilities to make their ideas a reality. This includes the difficulty in procuring funds to gain access to often very expensive equipment, which for any start-up is a problem let alone for entrepreneurs. This demographics' needs most often cluster around the IT and traditional skills fields. A makerspace is a location which provides access to the space, physical equipment and overall support that entrepreneurs need in developing their ideas, for a small monthly fee comparable to a gym membership. This allows entrepreneurs to work on developing their future big-business ventures without breaking the bank at the start (Osterwalder and Pigneur, 2010). ZlínMakerspace recognized this need but also the limitations of current makerspaces, which tend to either be too broad in their offering, hence limiting the access to specialized areas, or too specialized and, therefore, not recognizing the need for holistic approaches in many fields. ZlínMakerspace, therefore, creates a space which brings IT and artisan trades together under one roof, fully equipped with the resources associated with these fields. It focuses on two core areas which, today, tend to overlap and need support from one another, while being specialized enough to ensure an adequate resource offering for each. This unique approach is inspired by the traditional interpretation of the brain with the left-hand side cognitive abilities (for the IT skills), and the right-hand side creative abilities (artisan, traditional, handmade skills).

ZlínMakerspace provides its target customers the resources they need in order to make their dreams a reality – to turn their ideas into profitable ventures. ZlínMakerspace not only provides access to key physical resources but also provides support in the start-up business phase by offering access to know-how from professionals and mentors, as well as opportunities for members to sell their products and/or services.

ZlínMakerspace is designed to cater to all the varying needs of its target customer base. This is why its entire design is focused on providing services and resources for all the creative needs of the mind – from the technical to the imaginative (Barniskis, 2014). Even the design of ZlínMakerspace is not by accident, meant to represent the traditional roles of the left and right side of the brain. ZlínMakerspace has two main rooms: (i) the cognITive room; and (ii) the ARTisan room.

The cognITive room consists of all the equipment and resources that pertain to the high-tech and IT needs of customers. Equipment includes 3D printers, computers, CNC machines and photo developing tools, while software ranges from the Adobe creative cloud to Raspberry Pie programming software (Makerspace, 2012).

The ARTisan room incorporates more traditional equipment and tools for activities such as sewing, simple woodwork, arts (painting, drawing), sculpting and other handmade endeavors.

MYShop is the third key area of ZlínMakerspace which acts as an all-in-one stop shop for members to purchase supplies they may need for their endeavors (that are not offered as a part of their membership). MYShop also functions as a sales channel for members wishing to profit from their ZlínMakerspace creations by selling members' work on their behalf, only taking a percentage of profits upon sale. If the item does not sale, ZlínMakerspace does not charge the member anything.

ZlínMakerspace also has a recycling area which serves many functions. For one, it creates a recycling center for the makerspace and the community at large. Secondly, it allows members full access to the recyclable material within the center for free, giving members access to materials for their endeavors within ZlínMakerspace. It also contributes to ZlínMakerspace's firm belief in sustainability and environmentally-conscious behavior.

The café and venue serve as additional revenue streams for ZlínMakerspace but also as an extension of their services. The venue is the main location for many seminars, workshops and other

events which serve as educational opportunities for members and the community at large. It is also the location used for the Fakers & Makers fair which brings the community together.

Mentorship is another aspect of ZlínMakerspace which contributes to its collaborative value. It gives members access to mentors who are professionals in their fields. These mentors are available to offer know-how and experience to members in their start-up endeavor. Membership provides members full access to all aspects of ZlínMakerspace.

Customer Segmentation

In a world where creativity drives change and innovation, and ideas are developed at any age, entrepreneurship is no longer a word related to a specific group of people (Osterwalder and Pigneur, 2010). From the young makers that enjoy playing with plastic, to the experienced programmers that freelance on a daily basis, self-directed individuals and entrepreneurs, ranging from different ages (18+) and backgrounds, are welcome to elaborate and build their own ideas at ZlínMakerspace.

Aiming to drive the creative endeavors, ZlínMakerspace has a segmented approach to its customer segment.

Students will benefit from the space, resources and mentorship provided within the ZlínMakerspace to make tangible pieces which may relate to their studies or employment purposes. With access to a community of members, partners and staff students can develop their skills and gain experience in the basis of trial-and-error and shared knowledge.

Individuals driven by specific goals, whether it is the creation on Minimum Viable Products (MVP) or the execution of professional activities, will gain access to the space and resources for its realization. Further support in starting and running their business will add value to the individual's experience at ZlínMakerspace.

Organizations will be able to provide a multitude of their employees with the opportunity to complete tasks and individual projects without incurring in fixed asset costs. As well as

benefiting from the infrastructure of ZlínMakerspace, corporate members will have the possibility to increase their network.

Customer Relationships

Providing all the necessary means for customers to help themselves, ZlínMakerspace offers a self-service facility; nevertheless, a dedicated personal assistance can be provided by the mentors and staff that are there to guide the fakers and makers in the process of building their ideas. In order for the customers to get full access to ZlínMakerspace and the benefits mentioned above, a membership must be acquired. Memberships vary according to the type of user. Whether it's a student, an individual or a corporate membership, users must join the community for at least 6 months as stipulated in the contract.

Upon acquiring a membership customers will have full access to the ZlínMakerspace resources in each of the three main areas: the cognITive room, the ARTisan room and MYShop. Each of the members will be able to use the machines, software, tools and materials provided in each of the rooms according to their interests and needs in a self-service way.

The high-tech driven individuals will benefit from state of the art IT resources such as machines and software that represent a significant investment. These will be available to members on a self-service basis as they walk in the room; however, in the case that the machines are all being used a time limit will be established by the staff in charge in order to meet the customer's requirements. A booking service will also be available in periods when the demand is higher so as to keep a well-flowing system while maintaining order.

The artsy customers will make the most of the machines and tools to create their more traditional or handmade pieces (Barniskis, 2014). Moreover, the ARTisan room will provide members with consumable materials and supplies, which would otherwise have to be purchased separately, for their creations. MYShop is another space, specifically for crafty members to benefit from. The makers will be able to use the shop as a channel for selling their products without having to make an extra effort. Similarly, these members can take advantage of the different events carried out for

the same purpose, such as open door days and the Fakers & Makers fair. These represent valuable opportunities and exposure for makers to start-up their business.

Brand and Channels

ZlínMakerspace is not only a makerspace, it is a brand in itself. Therefore, the company's image is very important for ensuring the value proposition is conveyed accurately. Visually, this is best done through the logo, slogan and brand colors.

The ZlínMakerspace Slogan is: *Fake it til' you Make it.*

The ZlínMakerspace logo includes the company name and an image of a brain, as can be seen below in Figure 1. The brain is a very important part of the logo as it represents the values of the company which promote creativity, innovation and collaboration on an intellectual level.

Figure 1: ZlínMakerspace Logo

ZlínMakerspace's logo incorporates the brand colors: green, orange and grey (Table 1)

Color Code	R	G	B
Green	1	74	1
Orange	251	136	0
Grey	156	158	156

Table 1: ZlínMakerspace Brand Colors

Green is used to represent the entrepreneurial or grassroots spirit of ZlínMakerspace. It is a positive color representing harmony and equilibrium between the head and the heart, or between the two

traditional roles of the brain. Green also represents environmental consciousness, an important aspect for ZlínMakerspace.

Orange is synonymous with optimism, which ZlínMakerspace represents in the positive reinforcement and support it offers its members. It also represents hope after failure, because ZlínMakerspace wants to eradicate the fear of mistakes from its members by promoting trial-and-error learning.

Grey is used when the slogan is incorporated in the logo and acts as a secondary color to enhance the primary colors, the green and orange.

ZlínMakerspace also has secondary logos for its main service areas, discussed in detail later. The logos are:

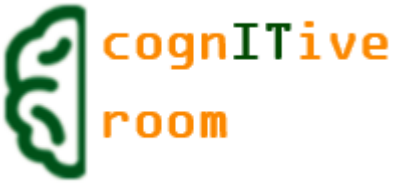


Figure 2: CognITive room Logo

The letters “IT” in cognitive must be in orange and capitalized while the other letters are green and lowercase. The partial-brain must be green.
In text it is always written as ‘cognITive room’

Figure 3: ARTisan room Logo

The letters “ART” in artisan must be in orange and capitalized while the other letters are green and lowercase. The partial-brain must be green.
In text it is always written as ‘ARTisan room’

Figure 4: MYShop Logo

The word “my” must be in green and capitalized while the word “shop” is orange and lowercase. The letter ‘o’ in shop is replaced with an image of the brain in the main logo.
In text it is always written as ‘MYShop’

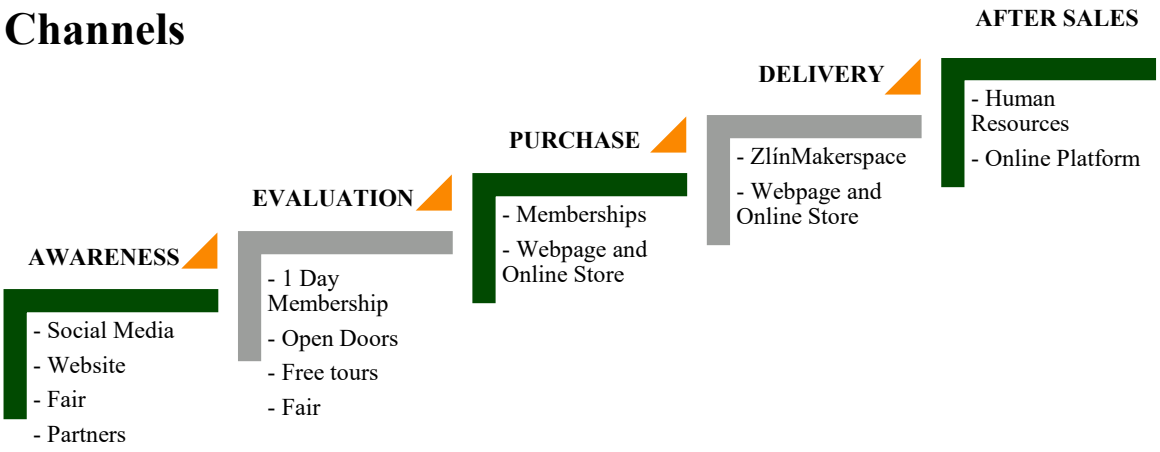


Figure 5: ZlínMakerspace Channels

ZlínMakerspace makes use of a variety of channels for raising awareness, offering customers a means to evaluate their offerings and eventually a way to purchase membership with delivery and after-sale support options as well (Figure 5).

ZlínMakerspace will raise awareness through their website www.ZlínMakerspace.com (including online shop), social media and partners which include the international community of makerspaces and local educational institutions.

Customers can evaluate the ZlínMakerspace service through a one day membership called “FakeYourPLACE”. “FakeYourPLACE” will give potential customers the opportunity to use all facilities, equipment and services in the ZlínMakerspace for an entire day in order to determine whether or not they want to purchase a full membership. “FakeYourPLACE” is limited to one person per year and is subject to a screening process.

Open doors are another way ZlínMakerspace will allow customers to evaluate their offering. Open doors are special events which allow non-members to tour the facility and test certain equipment with mentors and professionals present. Members of the ZlínMakerspace will also be on hand to provide personal accounts of their experiences, showing what they have been able to accomplish with their membership. Open doors are open to all and pre-screening is not required. Tours of the facility are also available upon request during working hours or 24/7 on the website through a virtual tour.

The Fakers & Makers Fair is also a great opportunity for potential customers to evaluate the benefits of ZlínMakerspace. The Fakers & Makers fair is similar to an exhibition fair where members get to exhibit and/or sell the work they produce in ZlínMakerspace for free (no charge for booth/stand and no percentage of profits retained). Potential customers can see for themselves what ZlínMakerspace produces by visiting the fair.

Full membership to ZlínMakerspace gives full access to all parts of ZlínMakerspace including the cognITive room, ARTisan room, MYShop, and the venue and café. This includes all the equipment, supplies and services that are offered in the aforementioned. The human resources of ZlínMakerspace are also available to members, from the employees who offer safety training and support to the mentors and professionals who are there for guidance. Members receive reduced rates on venue and café rental.

After purchasing membership, members receive full access to the online platform on the website. The online platform is a place for members to share experiences and successes while building a community for networking, support and inspiration. There are free resources available in the online library that can help members improve their skills and build their business (a theoretical support system to the practical one offered on site at ZlínMakerspace), news updates, blogs and articles from staff, mentors and members as well as an online booking system to ensure members have access to the facilities and equipment they need when they want. The website also includes the online shop (MYShop Online) where members can again sell their products and services while ZlínMakerspace only retains a percentage of profits.

Key Resources

The Key Resources of our ZlínMakerspace consist of the following:

- **Physical**
  - Building
  - Consumable and Non-Consumable Materials
- **Intellectual**
  - Brand
  - Creative Network
  - Partnership (with educational institutions and incubators)
- **Human**
  - Staff
  - Mentors

The ZlínMakerspace itself is by far one of the most important key resources. The non-consumable and consumable key resources include the equipment, tools and materials used in ZlínMakerspace, namely those within the cognITive room and the ARTisan room (see Appendix 1). They are essential in promoting the value proposition which is to offer members with access to the resources needed to support their entrepreneurial ventures – in turning their dreams into realities.

Key intellectual resources include the internal creative network consisting of members, employees and mentors. Members benefit from each other through collaboration in the form of shared ideas, experiences and aid. Similarly, mentors offer know-how and professional expertise to members in developing their ideas within ZlínMakerspace. They take this support to another level by assisting members throughout the entire start-up process – from building their ideas to creating viable business opportunities. Partnerships help ZlínMakerspace gain access to members but, more importantly, to mentors as well.

ZlínMakerspace's human resources consist of extremely knowledgeable individuals who offer support to members and ensure the functionality of the space, among other activities.

Key Activities

ZlínMakerspace's key activities focus on service delivery in the aim of maintaining a creative and safe work environment for members. From the mandatory safety training delivered before any equipment is used, to the support from expert employees.

Members will have access to potentially dangerous equipment, particularly if handled incorrectly. It is the responsibility of ZlínMakerspace to ensure the safety of its members by providing mandatory safety training to all members, which is to be attended before any equipment is used. This means that every employee must understand the safety procedures, be able to train others, monitor that safety is practiced at all times through proper machine use and procedures and that rules are strictly adhered to (Makerspace, 2012).

To maintain the ability to offer the value proposition, keep customers and eventually earning revenues, the functionality and accessibility of physical resources has to be ensured (Osterwalder and Pigneur, 2010). To ensure fully functional resources maintenance procedures have to be run on a regular basis both in the cognITive room and ARTisan room. Tracking the use of consumable materials and keeping an adequate stock level attributes to the functionality of equipment and tools as well. Furthermore, access to facilities and resources has to be managed by coordinating bookings of machinery, as well as the venues and sales area within MYShop.

Another key activity and basic part of the business model is mentoring. Expert advisors provide general help and support to ZlínMakerspace's members. They work one-on-one with members or project groups to help them achieve their individual goals by assisting, supporting and encouraging them. Simultaneously this contributes to the aim of building a community and inspirational environment. It contributes to the core values of the organization by attributing to the unleashing of potential, the encouragement of innovation and most importantly emphasizing on collaboration through shared social learning.

To operate successfully and expand the business, the acquisition of strategic partners and collaboration with them is crucial for ZlínMakerspace. Establishing partnerships is a key activity as this secures access to a pool of potential members, as well as mentors (Osterwalder and Pigneur,

2010). Partnerships also help spread the ZlínMakerspace brand and offering which will allow for the eventual establishment of more ZlínMakerspace's in various cities, all with the same mission, vision and core values. For further growth of ZlínMakerspace, market demands have to be continuously observed in order to identify what current and potential customers want and what they are missing in their activities.

The cognITive room is run by the IT Manager who ensures all equipment and software is functioning accurately. The ARTisan room is led by the Maintenance Technician who maintains equipment and adequate stock levels of consumable materials. The Administrative Manager runs the front end while the General Operating Manager keeps the business running.

Key Partners

ZlínMakerspace's key partners include the international and local community of makerspaces, local educational institutions and incubators. These can be broken into two main groups, namely strategic alliances and coopetition.

Strategic Alliances

The three strategic alliances which ZlínMakerspace wishes to establish in its initial phase are with the Municipality of Zlín, Tomas Bata University and IPA Slovakia.

City of Zlín situated in southeast Moravia, a statutory city, university seat and center of Zlín Region with 76,000 inhabitants and many incoming students is an ideal city for ZlínMakerspace. The Point of Single Contact (PSC) at the Trades Licensing Office of the Municipal Authorities of the town of Zlín was established with the main purpose to simplify the process of starting a business for new entrepreneurs. PSC will be literally ZlínMakerspace's first partner in order to establish the business.

Tomas Bata University was founded in 2001 in the city of Zlín and is known for its positive approach to innovation and research. Currently Tomas Bata University has more than 12,000 students.

The representatives of the University have welcomed the idea of having a makerspace in Zlín. In an unofficial talk, they confirmed their belief that a makerspace would have a huge impact on education, encouraging curiosity and establishing an appetite for challenges. They claimed it would also complement the theory taught in class. The Tomas Bata University expressed an interest in establishing a partnership with ZlínMakerspace, providing access to mentors from various fields and also subsidizing membership fees for their own students, particularly those studying science and engineering.

Further strategic alliances can be made in the future with the local educational institutions and different student unions.

IPA Slovakia is a one of the biggest and leading companies in Central Europe in the area of consulting, training, design and research which will be of a great help for ZlínMakerspace's establishing phase.

Competition

Industra, is a fablab located in Brno, which brings together people from area of design, coding, technology and engineering. It provides co-working spaces, office spaces, events, trainings and access to its facilities. ZlínMakerspace sees Industra as a key partner who will enable them with access to a pool of resources, namely the wide range of companies operating under Industra. These companies can get additional service offerings from ZlínMakerspace which they lack from Industra. Namely, while

Industra would be their business operational space, ZlínMakerspace will be their 'production' space; where they can come and build minimum viable products (MVP) to sell within the incubator. ZlínMakerspace would also offer network opportunities beyond Czech Republic due to international makerspace community connections.

Cost and Sustainability Model

Funding Requirements – Initial Investment

Reusable, physical manufacturing facilities, such as furnishings, tools and equipment refer to one-time expenditures which have to be invested in once to establish ZlínMakerspace. To set up and offer the earlier described areas of the value proposition an initial investment of some €100,000.00 is required. This will be covered by crowd-funding such as kickstarters.com and other direct investors. In addition, the purchase of used, hence more affordable, equipment and donations will also be considered to reduce this amount. The number is estimated for a group of up to 75 members to work simultaneously and includes tools and equipment for all the areas, as well as necessary safety equipment. Consumable materials are also considered to be part of the start-up investment. However, these items have to be replaced on regular basis and are therefore also considered as part of the cost structure which will be discussed in further detail in the following section.

The budget determination was carried out from a top-down approach within the contracted organization, based on the scope definition and available data of similar projects. The estimation of the project costs was done for the most aggregated levels following the WBS and represent the approved financial resources against which the project performance will be measured and controlled.

Cost Structure

ZlínMakerspace operates a hybrid cost-structure model, it is a cross between value-driven and cost-driven business models. With the desire to promote creation and innovation, ZlínMakerspace offers a premium value proposition for members with a high degree of personalized services. Nevertheless, minimizing costs is crucial in order to provide more benefits to the customers (Cavalcanti, 2013).

The cost structure is composed of all expenses which incur while operating ZlínMakerspace and can be divided into fixed and variable costs. Table 2 below provides an overview of all estimated

costs per month (in €). The data are based on local averages and values taken from similar makerspaces.

The main drivers of the fixed costs are salaries and the rent of a 2000m² property in Zlín. Failure to meet these liabilities results in loss of the space, the basis and of ZlínMakerspace. Salaries ensure the maintenance of adequate human resources which represent a significant success factor in continuing the operations of ZlínMakerspace.

To replace and restock consumable materials, a monthly budget of approximately €500 is available. The same applies to marketing expenditures. Both make up the main portion of variable costs. Consumable material expenditures are significant in satisfying our members' needs of realizing their business ideas (Cavalcanti, 2013).

As consumable materials are also part of the start-up budget, costs to replace these may not arise during the first months. The opposite applies for marketing expenditures. They are crucial in establishing the brand and growing the membership base and, therefore, mainly arise before and during the launch of ZlínMakerspace.

It is expected that an approximate total of €9,000 in expenses will be incurred monthly while operating ZlínMakerspace (Table 2). This amount can be covered by the expected revenues, of which less than 75 per cent are needed to cover the costs.

Fixed Costs	**€/month**
Salaries	
General Operating Manager	1,100
IT Manager	1,000
Administrative Manager	1,000
Maintenance Technician	800
Mentor	(volunteer)
Salesperson	800
2 Baristas *(weekends only)*	200
Cleaner	300
Property	
Rent	1,500

Building maintenance and property tax	400
Internet & TV License	40
Trash	20
Insurance	400
Variable Costs	**€/month**
Consumable Material	500
Utilities	
Electricity	70
Gas	50
Water	30
Marketing	500
TOTAL	**8,710**

Table 2: Estimated monthly expenses for ZlínMakerspace

Revenue Streams

Recurring revenues result from continuous and consistent payments by customers. Selling continuous access to services will help maintain costumers on a regular basis. With membership, customers will receive access to tools, facilities and expert advisors. They will also have the opportunity to subscribe under a semi-annual or annual membership plan. The pricing range differs between students, individuals and corporations (Cavalcanti, 2013).

Type of Membership	Monthly Rate (€)
Student	35
Individual	50
Corporate	100

Table 3: Membership Fees

As the market validation based on surveys showed, most respondents were willing to pay the membership fees rendering ZlínMakerspace's pricing reasonable. Furthermore, the majority of those who expressed a willingness to pay up to €35 were students, who would also receive subsidized fees based on the partnerships ZlínMakerspace establishes with educational institutions in Zlín Region. Corporate membership fees are based on the fact that they are transferrable and can be used by multiple individuals within the same organization, although only one at a time.

Finally, it is important to note that all membership types offer access to not only the physical resources of the facility but to intellectual resources as well, namely the mentorships, competent staff and professionals, the intellectual community of members; all of which creates a cohesive support system aimed at assisting the members' business start-up process. Yearly, more favorable, membership fees will be offered for ZlínMakerspace's regular members as well. A membership to ZlínMakerspace is an investment in your future.

Transaction revenues result from one-time customer payments. ZlínMakerspace's transaction revenue stream results from the following:

1. Workshops (1 to 2 days) in the area of Information Technology (IT) and crafting will be held on a monthly basis. Exclusive discounts will be offered to members of ZlínMakerspace; whereas, non-members wishing to attend will have to pay the full workshop fee).
2. Venue rentals result from granting individuals or groups the right to use an area of ZlínMakerspace for a fixed period of time in return for a negotiated fee. ZlínMakerspace offers a 300m² event hall for rent as well as a café.
3. MYShop generates revenues from sales on the basis of two main selling points:
    a. Profits from the materials sold for use (primarily) in the ZlínMakerspace – namely materials needed but not included in membership.
    b. Percentage of profits from the sale of products produced by the members of ZlínMakerspace.

Breakeven Analysis

On the basis of estimated monthly expenditures and established revenue streams, a breakeven analysis for ZlínMakerspace can be conducted. Since it is expected that the largest revenue stream will be from membership fees, it should stand that membership fees alone can cover monthly expenses.

Based on Table 3, the monthly expenses are expected to be less than €9,000. In order to meet these liabilities, ZlínMakerspace needs to aim for 130 student members, 42 individual members and 21 corporate members (Table 4). These numbers do not have to be exact and can be increased or decreased within each category accordingly, however, this is the current aim for ZlínMakerspace in order to breakeven.

Membership	Monthly Rate (€)	Expected Number of Members	Monthly Stream (€)
Student	35	130	4,550
Individual	50	42	2,100
Corporate	100	21	2,100
			Total **8,750**

Table 4: Membership Fees and Breakeven

External Environment

Macroeconomic Environment

The concept of a makerspace developed in the 1990s and there are more than 1,500 makerspaces world-wide today (Hatch, 2014). A makerspace is a collaborative learning environment where people come together to share materials and skills. The maker movement is a cultural movement founded on the traditional craftsmanship, do-it-yourself ethic. The movement has been growing significantly in the past few years, with over 100 maker fairs being held around the world in 2013 alone. This has led to 2014 being the breakout "Year of the Maker" with even more fairs in more cities and extensive developments in platforms for supporting collaboration. And year 2015 is rumored to have exceeded the number of fairs compared to 2014.

There are many factors driving the growth of makerspaces recently:

1. Expensive resources such as 3D printers and software that people have an interest in using/learning how to use, and require access to for their goal fulfilment, but cannot necessarily afford
2. Social networks bred a culture of collaboration

3. The sharing economy has become this year's hottest trend
4. Increasing collaboration between the arts and sciences
5. Increased interest in coding and electronics that people want to explore more through tinkering and trail-and-error
6. Desire to share knowledge and participate in a collaborative, creative community

Makerspaces focus on two aspects; (i) community – not just about the space and resources, it is about people; and (ii) learning – self-directed, hands-on educational environment where you can think and do. Makerspaces have even caught the attention of educators who understand the value of trial-and-error, hands-on learning opportunities offered by such facilities.

Microeconomic Environment – Zlín

Zlín is the main city of Zlín Region with a significant population within ZlínMakerspace's customers, namely students, professional and freelancers, and entrepreneurs (Czech Statistical Office, 2017). It comes as no surprise then that this is the desired location for ZlínMakerspace. Zlín is a city known for its culture for entrepreneurship and already has a significant creative community. Based on this, there is a need to acknowledge the present maker culture and try to move it in the direction where it melds some of the most recent high-tech advances with low-tech inventiveness found locally. Zlín lacks a place like ZlínMakerspace at the moment, which gives people a chance to move further and faster by providing access to tools, space to work with like-minded people, mentors and business contacts, government or university connections. Thus, Zlín needs a place where self-driven people can have access to the resources they need to make their dreams a reality.

Market Validation

ZlínMakerspace conducted interviews with academic institutions (i.e. University of Tomas Bata in Zlín) its students and the citizens of Zlín.

Representatives expressed their willingness to collaborate with ZlínMakerspace, once operational. They expressed their belief that Zlín is in need of a place which will bring together like minded people to work on innovative projects. Representatives from the University of Tomas Bata in Zlín

stated that ZlínMakerspace will have a "huge impact on education, encourage curiosity and establish an appetite for challenges". To confirm their stand, they expressed a readiness to subsidise the membership fees for some of their students, namely those in the science and engineering fields.

Individuals from a range of professions and ages were also surveyed and responded by welcoming the establishment of ZlínMakerspace in Zlín. Nearly 90% of those surveyed stated that they would visit ZlínMakerspace several times per month. These same individuals, of which 77% were students, also stated that they would like to have access to a range of tools; however, a higher interest was expressed in IT related equipment. That is to say, 100% of respondents expressed an interest in the cognITive room although the ARTisan room and MYShop were also well accepted amongst respondents.

The survey also found that 60% of respondents, including students, were willing to pay up to €35 monthly for membership. 20% were willing to pay more than €35 while the other 20% did not wish to pay more than €30. It is interesting to note that most respondents who wished to spend several days a month at ZlínMakerspace were willing to pay more.

70% of respondents expressed a willingness to volunteer at ZlínMakerspace, mainly by helping with day to day operational activities, fundraising and giving guided tours.

Competitive Advantage of the Business Model

ZlínMakerspace offers more. Unlike its competitors, ZlínMakerspace does not limit its offering to a single industry such as Industra who specializes in electronics and software. ZlínMakerspace also supports its members, providing not only the resources, being a "production place", but also additional services necessary for planning and starting a business. This broader offering allows ZlínMakerspace to reach more customers by meeting a wider range of needs extending further than just the IT sector (conITive room, ARTisan room, MYShop, Online portal).
It is this larger offering of resources and services that renders the membership fee, making it the best value for pound offering.

These additional services also make up the multiple revenue streams for ZlínMakerspace, which differentiates it from its direct competitor who only make money from memberships. Additional

revenue streams allow ZlínMakerspace to provide further benefits to its members in the form of highly-qualified staff and mentors, better (and more) resources and materials and similar.

The recycling center also represents a competitive advantage for ZlínMakerspace as it helps the business remain sustainable and green-conscious, setting a great example for the community, but also provides its members with additional materials. This is particularly important for those using the ARTisan room who may want recycled materials for their creations.

Overall, ZlínMakerspace's services improve on the current market offering of existing makerspaces, going beyond offering simple access to facilities by extending support and the variety of resources available.

Risk Analysis

Limiting Factors and Obstacles

The limiting factors facing ZlínMakerspace include the high fixed costs associated with the physical assets needed for the optimal operation of the space, as well as the need for a critical number of members in order to operate profitably (see breakeven analysis). The main issue resulting from these limiting factors is a lower revenue stream from membership fees. The fixed costs are essential in ensuring ZlínMakerspace's offering and cannot be lessened per say, but their impact can be softened. Also, while ZlínMakerspace has conducted extensive market analysis and recognized a need within the market, the worst case scenario resulting in less than adequate members may arise but can be countered. Both can be mitigated by ZlínMakerspace's incorporation of alternate revenue streams which can provide the funds needed to counter fixed costs if membership is low.

Critical Success Factors

ZlínMakerspace's success is partially contingent on a few factors. The location of ZlínMakerspace must be large enough to meet the facility needs of the business model, while at the same time

accessible by all main means of transport. Ideally this would be a location within the city that provides easy access from universities, incubators and interested organizations.

The fees are reasonable when compared to competitors (offering vs. fee). However, it is crucial for ZlínMakerspace to communicate the value of membership for all potential members. This is particularly important when considering the type of users interested in ZlínMakerspace's offerings, that is the cognITive room user and the ARTisan room user. While it may appear that the former is receiving a greater pay-off for their investment due to the fact that they receive access to extremely expensive technology while the latter is using more inexpensive materials, this represents a limited view of ZlínMakerspace's full service offering. ZlínMakerspace membership is an investment in the future of not only the member, but their business as well. This must be emphasized more with potential artisan members who will require the additional support ZlínMakerspace offers in the form of mentorship, Fakers & Makers Fair, and MYShop (in-store and online) retail services.

Developing the Location

Overview

A contracting organization specializing in property development is contracted to design and develop the property into a unique and innovative makerspace. The need for this project comes from the growing number of entrepreneurs (worldwide phenomenon) who dream big but lack the funds to turns these dreams into realities, especially in this turbulent economy. Also, there is a growing demand for entrepreneurial efforts, particularly in developing countries that need start-ups to generate economic growth from the bottom up.

ZlínMakerspace will receive funds by fundraising and a significant funding from generous investors who are eager to see the makerspace take off. This funding will make possible to rent a property, design and develop according to the vision. While the contracting organization is prepared to accept this project, they have recognized some constraints:

- Time – The project must be complete under 12 months to ensure ZlínMakerspace does not miss their window of opportunity in the market, which currently has a growing interest for makerspaces.
- Budget – ZlínMakerspace is restricted to €100,000.00 and cannot provide funds beyond this. The contracting organization is prepared to complete the project within the budget strictly under €100,000.00.
- Design and Property Development – ZlínMakerspace is not prepared for any structural changes to the property and are expecting the contracting organization to work with the property they have by simply renovating it. Similarly, ZlínMakerspace already has a vision for the makerspace and tentative floorplan which the contracting organization should be able to develop. The design cannot stray too much from the vision, for fear of creating a project misalignment, but is also constrained by the property itself since no structural changes/construction is to be conducted.

These constraints also serve as the basis of the project requirements which the stakeholders have been very adamant about. ZlínMakerspace refuses to go over their budget or time constraints, and insist upon the property structurally remaining the same and the design following their vision of an IT room to the left, art room to the right and shop in the middle, among other details. These requirements have led the stakeholders to agree upon a set of objectives that must be met upon project completion:

- A comprehensive architectural design which meets the design vision of ZlínMakerspace while serving the purpose of the makerspace from all aspects.
- The makerspace itself, the result of a completely renovated property according to the approved designs and vision.
- A fully operational makerspace with all the required and agreed-upon resources included.

To achieve these objectives, the contracting organization has proposed a project which will conduct a property analysis of the property to determine the physical and functional condition. Based on this, a design will be created and presented to the stakeholders, maintain their vision and elements of their preliminary design (floorplan). Upon approval, the design will be implemented and property development will be carried out accordingly. Renovations will then allow for the installation of procured resources according to the needs of the project sponsor and successful testing of the makerspace, which will require proof of it being prepared to a state of operational functionality, will mark the completion of the project and hand-over will be the last step in the project closure process. The contracting organization will conduct the project in a (11) month period with a budgeted value of €100,000.00.

Project Stakeholders

Designing and Developing a Makerspace location, project will involve several departments of the contracting development organization. The project is commissioned and sponsored by the ZlínMakerspace organization, namely its CEO and founder. The project, however, will be executed under the Project Manager's authority from the contracting development organization. The ZlínMakerspace organization, being an entrepreneurial start-up, does not have department which will be involved in the project and, therefore, the only representative and stakeholder from the client organization is the earlier mentioned CEO and founder. However, within the contracting development organization, there will be involvement from the Project Management Department, Design Department, Planning and Development Department, Finance Department, procurement Department, Administration Services and Legal Department. Seeing as all these organizations have the adequate personnel to complete the project, no external contractors or partners will be involved. Based on this breakdown of the project involvement, stakeholders have been identified and listed in Table 5 below.

Position	Title/Name/Organization
Sponsor Representative	ZlínMakerspace CEO and Founder
Project Manager	Project Manager
Project Management Department Representative	Project Assistant
Design Department Representative(s)	Team Leader (Indoor Design) and Team Leader (Outdoor Design)
Property Planning and Development Department Representative (s)	Team Leader for Property Analysis ; Team Leader for Property Development and Team Leader for Installation

Table 5: Project Stakeholders

Project Purpose

Business Need and Problem

There is a clear rise in the need for entrepreneurial endeavors, in both developed and developing economies where their microeconomic successes produce a trickle-up effect on the countries macroeconomic situation. As a result, the interest in entrepreneurial activities has also increased

worldwide, with more and more individuals looking to turn their great ideas into big business. However, oftentimes individuals with the entrepreneurial spirit lack access to resources and facilities to make their ideas a reality. This includes the difficulty in procuring funds to gain access to often very expensive equipment, which for any start-up is a problem let alone for entrepreneurs. This demographics' needs most often cluster around the IT and traditional skills fields. A makerspace is a location which provides access to the space, physical equipment and overall support that entrepreneurs need in developing their ideas, for a small monthly fee comparable to a gym membership (The Mentor Makerspace Group, 2013). This allows entrepreneurs to work on developing their future big-business ventures without breaking the bank at the start. ZlínMakerspace recognized this need but also the limitations of current makerspaces, which tend to either be too broad in their offering, hence limiting the access to specialized areas, or too specialized and, therefore, not recognizing the need for holistic approaches in many fields. ZlínMakerspace, therefore, creates a space which brings IT and artisan trades together under one roof, fully equipped with the resources associated with these fields. It focuses on two core areas which, today, tend to overlap and need support from one another, while being specialized enough to ensure an adequate resource offering for each. This unique approach is inspired by the traditional interpretation of the brain with the left-hand side cognitive abilities (for the IT skills), and the right-hand side creative abilities (artisan, traditional, handmade skills).

After raising the needed funds ZlínMakerspace will create, design and develop a unique makerspace, in a space which is large enough to meet the needs, but it must be developed according to the vision design. The project will improve ZlínMakerspace's ability to attract and cater to the demands of the target population while meeting the organization's strategic vision of providing their target customer with the resources to support the development of their ideas in a space where past, primitive skills, meet future, IT based skills.

Business Objectives

ZlínMakerspace's mission is to provide a creative and innovative space for fakers, makers and everyone in between. Their value proposition is aligned with their strategic vision; ZlínMakerspace aims to provide self-directed and entrepreneurial-driven individuals with access to tools, facilities and expert advisors, otherwise unattainable during humble beginnings. It offers a safe environment

and an inspirational community of creative and knowledgeable individuals who share the common goal of turning dreams into realities. When finding the means to do so is difficult, ZlínMakerspace eradicates the fear of trial and error by encouraging and supporting continued development and hands-on learning. ZlínMakerspace's brand is also a significant portion of their strategic vision as it encompasses their unique approach.

In order to maintain the integrity of ZlínMakerspace's strategy, it is important that the brand and its significance is understood and conceptualized in the project. The project's main objective thus becomes to produce a makerspace which encompasses and represents ZlínMakerspace's unique brand and approach to makerspaces in order to provide them with the physical infrastructure to move forward with their business strategy.

Project Overview

Project Description

The current project will focus on the design and development of ZlínMakerspace's location equipped with the required resources as outlined by the strategic vision. ZlínMakerspace requires that the physical property be developed and brought into an operational state before it can commence with the operational activities and open for business. The project will focus on two aspects: Designing and developing the property according to the vision both identified in the brand and strategy, and equipping the property with all the physical equipment and resources necessary for it to be operational. Both are heavily contingent on ZlínMakerspace's existent brand vision and design and require working closely with the founder in order to ensure the strategic vision is maintained.

The project, therefore, requires that the location with approximately 2000 square meters, be designed accordingly. This includes the design and development of (3) main areas including an IT room (cognITive Room), do-it-yourself studio (ARTisan Room) and store (MyShop), and the common areas which are inclusive of the recycling room, café and outdoor area (landscape, parking lot, and playground).

The project also requires fully equipping these areas with the resources (equipment, tools and technology) required by the target customer base for each area, as expressed by ZlínMakerspace's strategy. The first required aspect involves both the Design Department and Planning and Development Department, while the second aspect requires that the Planning and Development Department works closely with the Procurement Department. The final design must be approved by ZlínMakerspace's founder before the development ensues. The project will be limited to the design and renovation of the building itself, and the installation of the pre-determined physical elements, all other activities are outside the scope.

Project Scope

This project will be carried out by the property development organization hired to conduct the project on behalf of ZlínMakerspace. The project includes the design of ZlínMakerspace according to the strategic vision, and the implementation of the approved floor plan through the renovation of the 2000 square meter location. The deliverables of this project are a fully functional IT room (cognitive Room), do-it-yourself studio (ARTisan Room) and in-house store (MyShop) equipped with resources and technology in order to cater to the defined customer demand as outlined in ZlínMakerspace's strategy. The design must maintain the left-side vs. right-side of the brain vision, i.e the IT room must be to the left of the building, the ARTisan Room to the right, and the MyShop in the middle. This project does not include ongoing operations and maintenance of the three defined areas and the equipment therein. The allocation of human resource capital is also not within the scope of the project. This project will be accepted once the completed renovation adheres to the planned architectural layout, safety regulations and standards, with equipment and software successfully installed and tested in each area. The project will be developed and implemented within an (11) month period with a budget of €100,000.00.

Project Assumptions

In order to design and develop the makerspace location for ZlínMakerspace, the project management team has taken the following assumptions into consideration:

- The property itself will allow for the development of the makerspace within the design vision requirements of ZlínMakerspace. This means that the vision will be able to translate and be reflected considering the physical properties of the property.
- All the resources needed for the property development and installation of equipment and materials into the makerspace can be obtained on the market within the budget. This means that no resources will have to be procured from other markets outside the region which would increase the costs and affect the overall budget.

Project Constraints

The project also has constraints which have been identified as possible limitations on the project's development:

- Design: The design must ensure that the cognITive room is located on the left hand side of the building, the ARTisan Room is located on the right hand side of the building, and MyShop is in the middle. This presents a crucial aspect to the project's successful completion and approval, since it is key to the strategic alignment of the project with ZlínMakerspace's overall strategy.
- Property Capacity: All the resources which need to be included in the ZlínMakerspace and its specialized areas need to fit within the 2000 square meter building, while ensuring they are also accurately located by area.
- Time: The project must be designed and implemented under a year or ZlínMakerspace risks looking its market advantage.

Budget: This project must be completed with a maximum value of €100,000.00, which includes the project budget and mark-up for the contracting organization at the end.

Project Requirements and Deliverables

In order for the project to be considered successful it needs to meet the following requirements upon completion, which also make up the main premise of the acceptance test:

- The final design of ZlínMakerspace must incorporate the (3) defined main areas as well as the common areas. The main areas must be situated in the appropriate parts of the building coinciding with the ZlínMakerspace brand strategy and vision.
- The property must be developed and renovated according to the final approved architectural design.
- The appropriate equipment, tools and technology needed for each of the main areas must be procured (Swan, 2014). This includes all the specified resources as per the ZlínMakerspace business plan which highlights their offering. The equipment, tools and technology must be tested and put into a state of operational functionality in their appropriate areas as per the final approved architectural design (floorplan)

Based on these requirements, the final deliverables which need to be produced by the completion of the project include:

- A comprehensive architectural design which meets the design vision of ZlínMakerspace while serving the purpose of the makerspace from all aspects.
- The makerspace itself, the result of a completely renovated property according to the approved designs and vision.
- A fully operational makerspace with all the required and agreed-upon resources included.

Project Management Milestones and Deliverables

The Design and Development of a Makerspace Location project has (5) main deliverables which also represent crucial milestones in the project's implementation (Table 6).

Milestone/Deliverable	Estimated Completion Date	Responsible Individual
Property analysis study conducted	20/04/2018	Planning and Development Department
Architectural design developed	22/05/2018	Design Department
Property renovated according to architectural design	13/08/2018	Planning and Development Department
Equipment, tools and technology installed	18/02/2019	Planning and Development Department
Equipment, tools and technology tested	01/03/2019	Project Management Department

Table 6: Milestones and Deliverables for ZlínMakerspace Project

Cost Budget

The cost budget for this project was derived by taking a few important points into consideration. Firstly, ZlínMakerspace will receive funding for the establishment of the makerspace in the amount of €100,000.00 of which they have determined to allocate a maximum of €100,000.00 for the design and development of the makerspace.

Upon establishing the scope and required activities of the work breakdown structure, the overall project budget consists of the authorized cost baseline (90%) and management reserves (10%). These refer to the approved funds to execute the project and those withheld for unforeseen work respectively.

The budget determination was carried out from a top-down approach within the contracted organization, based on the scope definition and available data of similar projects. The estimation of the project costs was done for the most aggregated levels following the WBS and represent the approved financial resources against which the project performance will be measured and controlled.

Personnel and Other Resources

The resources identified as necessary for the successful execution of the project will be committed by the project sponsor and the contracted organization's departments, represented by leaders from each.

The project team of this project will need the direct involvement from the following departments: Project Management, Design, Planning and Development, and Finance. The designated personnel from each department will work under the leadership of the Project Manager throughout the execution of the project. They will require high knowledge of ZlínMakerspace and are expected to familiarize themselves with the company's strategy and vision, as well as their brand which represents a strong proponent of both. They should be experienced and flexible. These individuals will represent the Project Core Team.

The Project Support Team represents all personnel not directly connected to the execution of the project but still necessary for its successful completion. These personnel will be representatives from the following departments: Procurement, Administration and Legal. They will not be fully assigned to the project.

Furthermore, labor services will be outsourced for certain phase of the project but monitored by the respective team leaders. This includes the physical labor aspect of the renovation of the ZlínMakerspace, both internal and external, and the installation of equipment, again both internal and external.

All facilities and software required by the project, including software for the design and conference room for meetings, are available and provided by the contracted organization.

Project Organization

Project Organization Chart

The Project organization is decomposed as seen in Figure 6. The project sponsor is at the top, having a significant influence on decisions. Representing the project sponsor and their needs is the

project manager, who by in large represents the overall management of the project. The project team is then divided into two categories, the core team and the support team. The core team represents all personnel directly involved in the project while the support team represents all personnel who will assist in the project in certain phases. The core and support teams are further decomposed into departments and subsequently into department representatives, which are the personnel discussed earlier.

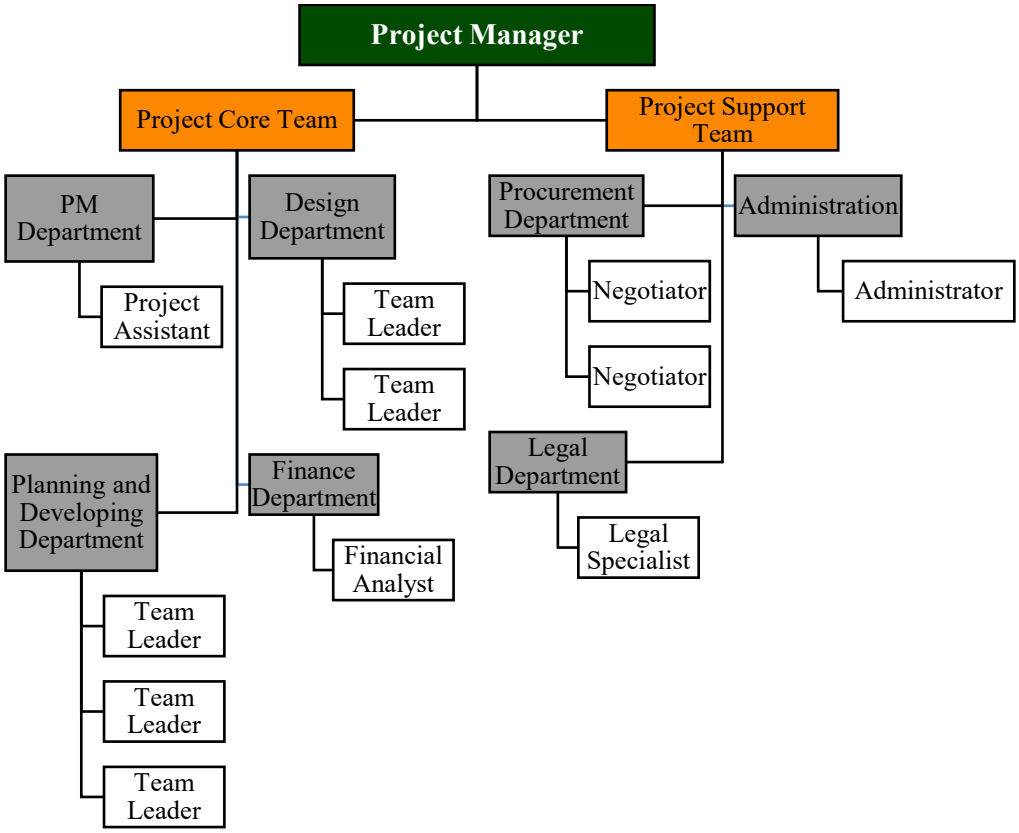


Figure 6: Project Organization Chart

Roles and Responsibilities

The roles and responsibilities of the project stakeholder are outlined in Table 7 below.

Stakeholder Title	Name	Roles and Responsibilities
Project Sponsor	ZlínMakerspace	Ultimate authority over certain decisions, but not over the project on a whole. Managing the impact of the project within their organization (start-up). Their responsibility includes ensuring that the project tasks and deliverables are completed, incorporating the needs and views of their target customers while providing functional expertise within the area of makerspaces. They also articulate the requirements and ensure business needs are met.
Project Manager	Project Manager	Leads the team in planning and implementing the project from its initiation to its completion. Responsibilities include scope and change management, keeping the project plan current, and other tasks normally associated with and required by project management standards.
	Project Assistant	The Project Assistant complements the responsibilities of the project manager. Maintaining contact with all those involved in the project, maintaining logs and ensuring the organization of the project

Project Management Department	Project Core Team Project Support Team	through meetings and other activities. The Project Core Team is responsible for all takes and activities directly related to the completion of project deliverables. The Project Support Team provides support on all the activities conducted by the Core Team, when needed.

Table 7: Project Roles and Responsibilities

Project Risks

The ZlínMakerspace renovation project faces the potential of risk from different perspectives, of which the ones that present the greatest threat include:

The risk that the architectural design and floor plan does not meet the strategic vision of the organization. Communication channels needs to be strengthened to ensure that the vision is adequately expressed. Regular meetings between the design team and client will also be conducted to ensure that the design is maintaining the strict design guidelines.

- The risk that the price of resources (equipment, tools and technology) needed for the makerspace will increase beyond budgeted value; mitigation strategy is to purchase the goods in advance with flexible contract terms that will allow for the best price allocation.
- The risk that the property does not support the architectural design and will require larger, structural construction activities which are beyond the project scope. In order to reduce this risk, the project manager will have a property analysis study conducted prior to the design phase.
- The risk that the property cannot support the installation of the required equipment, tools and technology. Again, the project manager will ensure a property analysis study is conducted to determine the capacities of the property prior to the procurement of said goods.

Project Scope

Project Overview

The ZlínMakerspace – Designing and Developing a Makerspace Location project is being undertaken to develop a makerspace location for ZlínMakerspace's business needs. It entails the creation of a design according to ZlínMakerspace's design requirements, as established by their brand, and the development of a makerspace according to said plans. The development also includes the installation of pre-determined resources in order to bring the makerspace to an operational state. It is planned to start on 01/04/2018 with an expected end date of 01/03/2019, not to surpass the 01/04/2019 date.

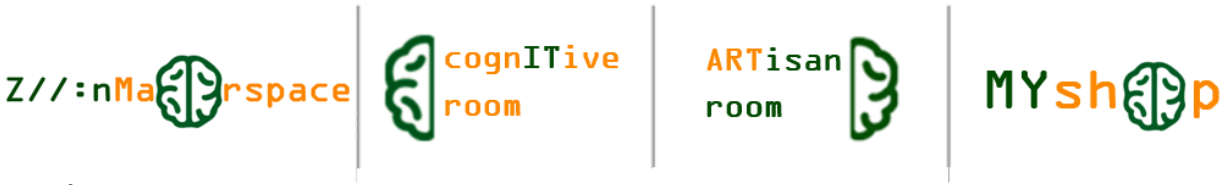
The project is being undertaken to produce the main aspect of ZlínMakerspace's business model, which is a makerspace designed to offer IT and artisan skill centers, fully equipped and ready to meet the needs of aspiring entrepreneurs. The project is being undertaken on behalf of ZlínMakerspace by a contracted organization with experience in designing and developing properties. However, the physical labor requirements of certain activities will be subcontracted as the organization does not have the physical resources to conduct such activities.

Project Description

ZlínMakerspace provides its target customers with the resources they need in order to make their dreams a reality – to turn their ideas into profitable ventures. ZlínMakerspace not only provides access to key physical resources but also provides support in the start-up business phase by offering access to know-how from professionals and mentors, as well as opportunities for members to sell their products and/or services.

ZlínMakerspace is designed to cater to all the varying needs of its target customer base. This is why its entire design is focused on providing services and resources for all the creative needs of the mind – from the technical to the imaginative. Even the design of ZlínMakerspace is not by accident, meant to represent the traditional roles of the left and right side of the brain. ZlínMakerspace has two main rooms: (i) the cognITive room; and (ii) the ARTisan room.

ZlínMakerspace's brand revolves around the idea that the brain is home to two distinct types of thinking; the left side responsible for cognitive activities and the right side responsible for handicraft creativity. Their vision encompasses this concept, that the two worlds which can also be described as old-age (past) and new–age (future), come together in one place (Figure 7).



ZlínMakerspace's logo | The IT room of the makerspace | The handmade skills room of the makerspace | The store of the makerspace

Figure 7: Brand as an Important Aspect of the Strategic Vision

The cognITive room consists of all the equipment and resources that pertain to the high-tech and IT needs of customers. Equipment includes 3D printers, computers, CNC machines and photo developing tools, while software ranges from the Adobe creative cloud to Raspberry Pie programming software. The ARTisan room incorporates more traditional equipment and tools for activities such as sewing, simple woodwork, arts (painting, drawing), sculpting and other handmade endeavors.

MyShop is the third key area of ZlínMakerspace which acts as an all-in-one stop shop for members to purchase supplies they may need for their endeavors (that are not offered as a part of their membership). MyShop also functions as a sales channel for members wishing to profit from their ZlínMakerspace creations by selling members' work on their behalf. ZlínMakerspace also has common areas which include reception, a recycling area, café and outdoor facilities.

In their first move to establish this makerspace, ZlínMakerspace acquired a property and secured funding for the development of their makerspace. While ZlínMakerspace already has a vision and

brand for their makerspace, they now need to produce the physical location accordingly. In order to do so, they need to design and develop the property they recently purchased.

ZlínMakerspace has even developed a design vision for their makerspace, incorporating all of the above (Figure 8).

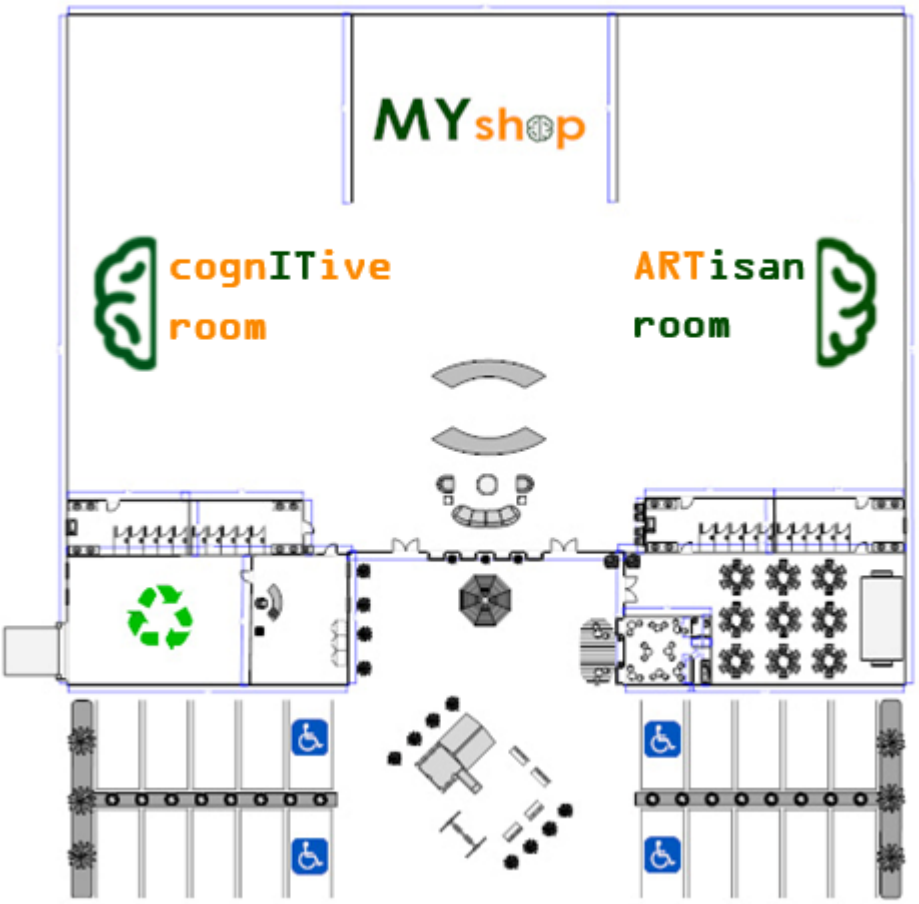


Figure 8: Design of ZlínMakerspace

Project Objectives

According to ZlínMakerspace's CEO and Founder, ZlínMakerspace's mission is to *provide a creative and innovative space.*. Their three core values which drive the business practice and strategy are:

1. **Creativity** – Unleashing the potential of the mind
2. **Innovation** – Turning dreams into realities
3. **Collaboration** – Encouraging collective genius

Considering this strategic position, the project's objectives can be aligned with those of ZlínMakerspace to ensure the project is executed and completed while maintaining strategic alignment. Therefore, the project objectives aligned with ZlínMakerspace's objectives can be seen in Table 8.

Strategic Plan Element	Project Business Objectives
Create a makerspace with three main elements that balance 'Left' and 'Right' brain skills; IT Skills room (cognitive room), traditional skills studio (ARTisan room) and unique selling point (MyShop)- ZlínMakerspace is where past and future meet under one roof.	To complete renovation of the property and grounds as per the approved architectural blueprints.
Provide access to space and resources for hands-on learning and prototyping.	To procure and install the physical equipment, tools and technology (including software) in the appropriate areas of the property, ensuring the areas are brought to an operational level.

Table 8: Project Business Objectives - Keys to Success

Scope Planning
Stakeholder Analysis

The needs, wants and expectations of project stakeholders must be translated into project requirements so that the deliverables can be adjusted accordingly to satisfy all stakeholders. In this project, the main stakeholders can be identified as the project sponsor, the project manager, the project core team and the project support team (Project Management Institute, 2018).

Project Sponsor

The project sponsor plays a key role despite not executing any authority over the project itself. The sponsor will define the main objectives of the project since they must be aligned with his organization's strategy, not to mention the time and budget constraints of the project. The project sponsor in this project is the ZlínMakerspace CEO and founder.

Project Manager

The project manager will be the ultimate authority of the project, making all vital decisions with the interests of the project sponsor in mind. The project manager will maintain all management responsibilities over the project including scope and change management.

Project Core Team

The project core team will be in charge of activities involved with directly executing the project. The team members include:

1. Project Assistant
2. Team Leader (Indoor Design)
3. Team Leader (Outdoor Design)
4. Team Leader for Property Analysis
5. Team Leader for Property Development
6. Team Leader for Installation
7. Financial Analyst

Project Support Team

The project support team is made up of representatives from various departments, the support team will be in charge of activities involved with supporting the execution of the project. The team members include:

1. Negotiator for Property Development
2. Negotiator for Installation
3. Administrator
4. Legal Specialist

It is not only important to understand who the stakeholder are and what they want, but to also understand the level of interest they have in the project and the degree of influence they hold over its successful completion. These levels are ranked in Table 9 on a scale from 1 to 5, where 5 represents the highest point.

Stakeholder Title	Degree of Influence/Power	Level of Interest
Project Sponsor	5	1.5
Project Manager	4.5	5
Project Core Team	3.5	4.5
Project Support Team	2	4

Table 9: Project Stakeholder Analysis

By taking into consideration the level the influence versus the level of interest, this can be potted on a power-interest matrix (Figure 9). This matrix helps the project manager and team select the proper communication approach for each stakeholder group to help ensure the control, quality and success of the project, while keeping all stakeholders happy and satisfied.

Figure 9: Stakeholder Power-Interest Matrix

Project Boundaries

It is important to identify the activities which both fall within the scope and those that are beyond the scope (Table 10). In this way, the project can stay on track and minimize the risk of going beyond the required deliverables.

Scope Boundary	Activity
In-Scope Activities	The in-scope activities include: - Conduct property analysis of infrastructure to determine physical and functional conditions; - Design property according to strategic vision of organization and desires of stakeholders; - Renovate property according to accepted design; - Install all equipment, tools and other materials/resources according to pre-determined lists; - Bring ZlínMakerspace to operational functionality.

Out-of-Scope Activities	The activities which do not fall under the scope are: - Construction or renovation to property that changes the infrastructural state (i.e. major works) - Procurement and installation of resources which need to be stocked up constantly (high use goods); - Procurement of goods/stock to be sold in the MyShop; - Operation and operational activities of ZlínMakerspace.

Table 10: Project Boundaries - In Scope and Out of Scope Activities

Project Approach

The approach taken to this project is a phase based one. The project consists of several phase which include: Project Management; Property Analysis; Architectural Design; Property Development; Procurement; Installation; and Testing.

These phases are discussed in further detail when the Work Breakdown Structure is presented and described.

Scope Definition

Project Deliverables

The main deliverables of the ZlínMakerspace project are based on the stakeholders' requirements identified earlier. The deliverables are identified and described in further detail in Table 11.

Project Phase	Project Deliverable	Description
1. Project Management	1.1 Planning	This deliverable aims to familiarize the Project Core Team with the project background. It includes the process of gaining knowledge and common understanding of the overall ZlínMakerspace brand and strategic vision, as well as their main objectives for the renovation project. The deliverable should result in the Project Core Team having a better understanding of what activities they need to perform in order to complete the project while maintaining an alignment to the sponsor's overall strategy.
	1.2 Meetings	This deliverables aims to support regular communication between the Project Team and stakeholders, to ensure that the project is aligned to the overall strategic vision.
	1.3 Administration	This deliverable acts as another form of control and management of the project. It is to help ensure the organization of the project and support its progress.
2. Property Analysis	2.1 Property Analysis Plan	This deliverable is to produce a property analysis plan which will provide a how-to-guide for completing the property analysis itself. It aims to identify what steps need to be carried out and on what aspects of the property to ensure that the results produce a clear picture on the overall condition of the property.
	2.2 Property Analysis Execution	The property analysis execution should put the property analysis plan into action and produce results on the physical and functional condition of the defined areas, and therefore, overall property to be renovated with the scope of the project.

3.Architectural Design	3.1 Technical Architecture	The technical architecture refers to identifying and determining the technical aspects of the design. This means understanding what the constraints the property itself will have on the design as well as what requirements are demanded from the sponsor and must be included in the final design in order for it to be accepted.
	3.2 Technical Standards	The technical standards of each area of the design need to be considered and defined before any design can be produced.
	3.3. Schematic Design	The floorplan design deliverable refers to the completion of a final floorplan for ZlínMakerspace which will be implemented in this project in order to produce the final product as defined by the scope. The design also includes the interior design, which is where the furniture, physical equipment and similar resources required for each space will be placed.
	3.4 Design Proposal	This deliverable refers to the proposal of the architectural floorplan design to the stakeholders for approval.
	3.5 Design Development	The deliverable is to produce the chosen schematic design with the proposed and negotiated alterations.
	3.6 Final Design Proposal	This deliverable refers to the re-proposal of the architectural floorplan design to the stakeholders for approval.
	3.7 Design Approval	This deliverable represents the acceptance of the final architectural design which will also represent the completion of this phase.
4. Property Development	4.1 Planning	This deliverable refers to the creation of a property development plan based on work completed in previous phases.
	4.2 Execution	The execution deliverable refers to conducting and completing all renovation activities necessary to ensure the successful completion of the property development phase.

5. Procurement	5.1 Planning	The deliverables refers to the planning of all procurement needs that results in a clear procedure with clearly defined resource needs and timeframe.
	5.2 Orders	This deliverable deals with the order process of the resources and should result in their arrival in due time and according to quality specifications.
	5.3 Delivery and Inspection	This deliverable aims to ensure the delivery and inspection of the ordered resources and represents that final activity of the procurement phase.
6. Installation	6.1 IT Room	Once the resources have been delivered, they must be installed into the cognITive Room according to the design plans and into the appropriate sections of the room.
	6.2 ARTisan Room	Once the resources have been delivered, they must be installed into the ARTisan Room according to the design plans and into the appropriate sections of the Room.
	6.3 MyShop	Once the resources have been delivered, they must be installed into the MyShop according to the design plans and into the appropriate sections of the store.
	6.4 Common Areas	Once the resources have been delivered, they must be installed into the common areas according to the design plans and into the appropriate sections of the areas.
6. Installation	7.1 System Test	This deliverable aims to produce a system test which will allow the Project Core Team to identify whether the project has been completed accordingly. It will ensure the proper completion of all phases in producing the required final product.
	7.2 Corrective Actions	This deliverable aims to take corrective actions upon conducting the system test. It will ensure that any discrepancies are dealt with appropriately.
	7.3 Acceptance Test	The acceptance test is the final control for the project and it represents the last deliverable in the project plan. A pass on the acceptance test represents the successful completion of the project.

Table 11: Project Deliverables

Scope Statement

This project includes the design of ZlínMakerspace according to the strategic vision, and the implementation of the approved floor plan through the renovation of the 2000 square meter location. The deliverables of this project are a fully functional IT room, Do-it-Yourself studio and in-house store (MyShop) equipped with resources and technology in order to cater to the defined customer demand as outlined in ZlínMakerspace's strategy. The design must maintain the left-side vs. right-side of the brain vision, i.e the IT room must be to the left of the building, the Do-it-Yourself studio to the right, and the store in the middle. The supplementary areas are thus limited by the building itself and the layout of the (3) main areas. This project does not include ongoing operations and maintenance of the three defined areas or the equipment therein. The procurement and installation of equipment and tools is limited to those which will allow operational functionality and are necessary for the everyday activities of the ZlínMakerspace. This includes the resources which are offered by ZlínMakerspace to its customers through membership, as outlined by their business offering. The stocking of MyShop with the goods to be sold within is outside the scope of this project. The allocation of human resource capital is also not within the scope of the project. This project will be accepted once the completed renovation adheres to the planned architectural layout, safety regulations and standards, with equipment and software successfully installed and tested in each area.

Work Breakdown Structure

The Work Breakdown Structure for ZlínMakerspace's renovation project is decomposed into project phases, deliverables and work packages (Appendix 2a and Appendix 2b). This work breakdown structure decomposition includes the total scope of the ZlínMakerspace project. The first level of decomposition is based on the project phases which best describe the required deliverables of the project. These main phases include project management, property analysis, architectural design, property development, procurement, installation and testing. The second level of decomposition identifies the deliverables that need to be submitted through each of the phases. The third level of decomposition is composed of work packages that contribute to the completion

of the deliverables and, therefore, the phases. The work packages are represented by the lowest item in the WBS of this project (Appendix 2c).

Prior to further developing this phase-based WBS, two other version were simultaneously developed in order to review the different approaches which could be taken and ultimately decide which would be better for ZlínMakerspace. The first alternative WBS was a functional-unit based WBS (Appendix 3) which divided the project into functional units on the first level, namely project management, HR, finance, accounting, procurement, marketing & communication, and legal. The purpose of this WBS was to get a better grasp of all the units which were involved in project and attempt to understand how the tasks would be divided among them. The problem with this approach was the inability to adequately distribute the project deliverables among the units and eventually produce clear work packages. The second alternative WBS was an area-based WBS (Appendix 4) which decomposed the project into the work areas on the first level. The purpose of this was to clearly identify which activities were required for each project area. The problem with an area-based WBS is the repetitiveness of phases under each work area and the distribution of works packages that each phase would contain. Ultimately, it was decided that the phase-based WBS was the best approach since it allowed for the clear and appropriate allocation and distribution of deliverables and did not contribute to the repetitiveness of phases or work packages. Thus, the phase-based WBS provides a logical approach to the project steps and shows the interconnectedness of each phase as well as the resources required for each process.

Resource Management

Human Resource Management

The human resources required for this project include the project manager, the project core team and the project support team. Their salary is based on industry standards and their hourly rate is based on an average (8) hour working days and a (20) day working month. It should be noted that all personnel working on this project are also allocated to other projects, therefore, their total working hours do not come from this project alone (Table 12).

Personnel	Department	Estimated Hours Needed
Project Core Team		
Project Manager	Project Management Department	1170
Project Assistant	Project Management Department	1060
Team Leader (Indoor Design)	Design Department	67
Team Leader (Outdoor Design)	Design Department	67
Team Leader for Property Analysis	Planning and Development Department	96
Team Leader for Property Development	Planning and Development Department	878
Team Leader for Installation	Planning and Development Department	50
Financial Analyst	Finance Department	84.8
Project Support Team		
Negotiator for Property Development	Procurement Department	56
Negotiator for Installation	Procurement Department	56
Administrator	Administration	648
Legal Specialist	Legal Department	124.8

Table 12: Human Resource Breakdown

Other Resources

This project also requires the use of contracted man power, or services, for certain activities. In particular, activities dealing with the property development and installation phases. For Property development, the activities which require hired man power are internal renovations and external renovation. Internal renovation requires sixteen (16) workers contracted to work 180 days, while external renovations will require four (4) workers contracted to work for 30 days (Table 13).

	Duration (Days)	Duration (Hours)	Number of Workers
Installing Furniture	180	1440	16
Installing Physical Equipment	30	240	4

Table 13: Contracted Resource Requirements for Property Development Phase

For the installation phase there are four activities which require contracted man power (Table 14). For installing furniture, four (4) workers will be contracted to work 16 hours each. For installing physical equipment, three (3) workers are required to work 16 hours each. Software installation requires one (1) worker to be contracted for 16 hours of work, installing tools requires one (1) worker to work a total of 8 hours, while for installing bulk materials two (2) workers will be contracted to work 8 hours each.

	Duration (Days)	Duration (Hours)	Number of Workers
Installing Furniture	2	16	4
Installing Physical Equipment	2	16	3
Installing Software	2	16	1
Installing Tools	1	8	1
Installing Bulk Materials	1	8	2

Table 14: Contracted Resource Requirements for Installation Phase

Resource Usage

The resource usage plan, Appendix 5, shows the amount of hours every individual resource needs per week for the entire duration of the project. The histogram below (Figure 10) shows the weekly resource demands of the project in order to determine if resources are being allocated excessively in given periods of time and to determine the need for resource leveling in the case that resource allocation is too disproportionate. Further necessary resources were described in the previous section, such as contracted human resource power.

As can be seen in the histogram below, the resource usage between week 19 and week 45 is identical and represents the property development phase, when all renovations are being conducted in the makerspace and no other activities can continue until this phase is complete.

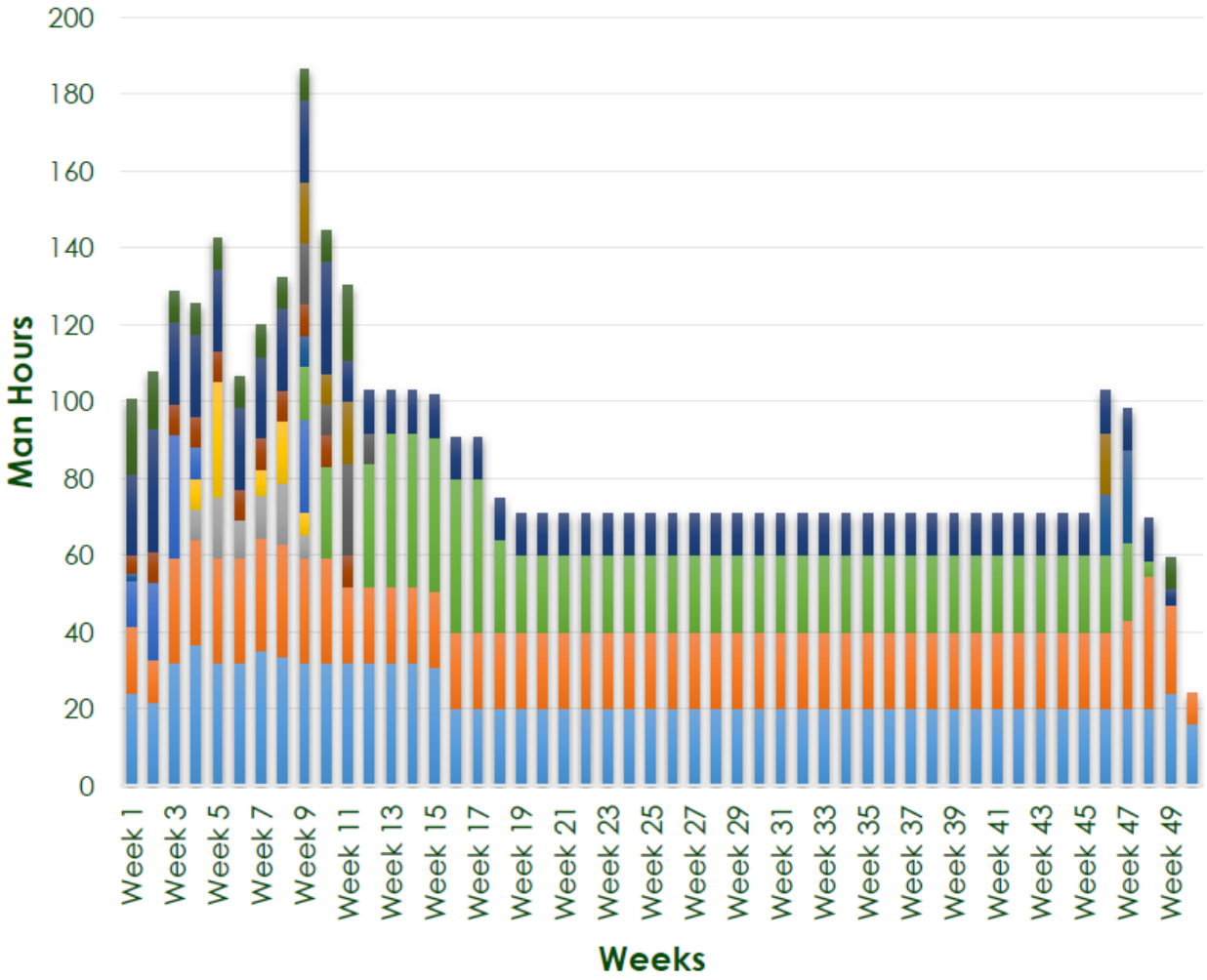


Figure 10: Histogram of Weekly Resource Usage

Key for the Histogram

- Project Manager
- Team Leader (Outdoor Design)
- Team Leader for Installation
- Negotiator for Installation
- Team Leader (Indoor Design)
- Team Leader for Property Development
- Negotiator for Property Development
- Legal Specialist
- Project Assistant
- Team Leader for Property Analysis
- Financial Analyst
- Administrator

Time Management

The project is foreseen to start on the 01 April 2018 and finish on the 01 March 2019. It is expected to have a duration of 240 days in total. The scheduling of the project is aligned with the new strategy of ZlínMakerspace and its needs.

Appendix 6 gives a description of the project activities and their timeframe.

Cost Estimation

Cost Breakdown Structure

The cost breakdown structure represents the subdivision of the overall project cost into the different cost control accounts which integrate the baseline: services, material, general and administrative expenses, and other disbursements (Project Management Institute, 2018).

The determination of these control accounts lies on the activities defined within the project's WBS and the direct and indirect costs that will be allocated to each in order to monitor and control them according to budget.

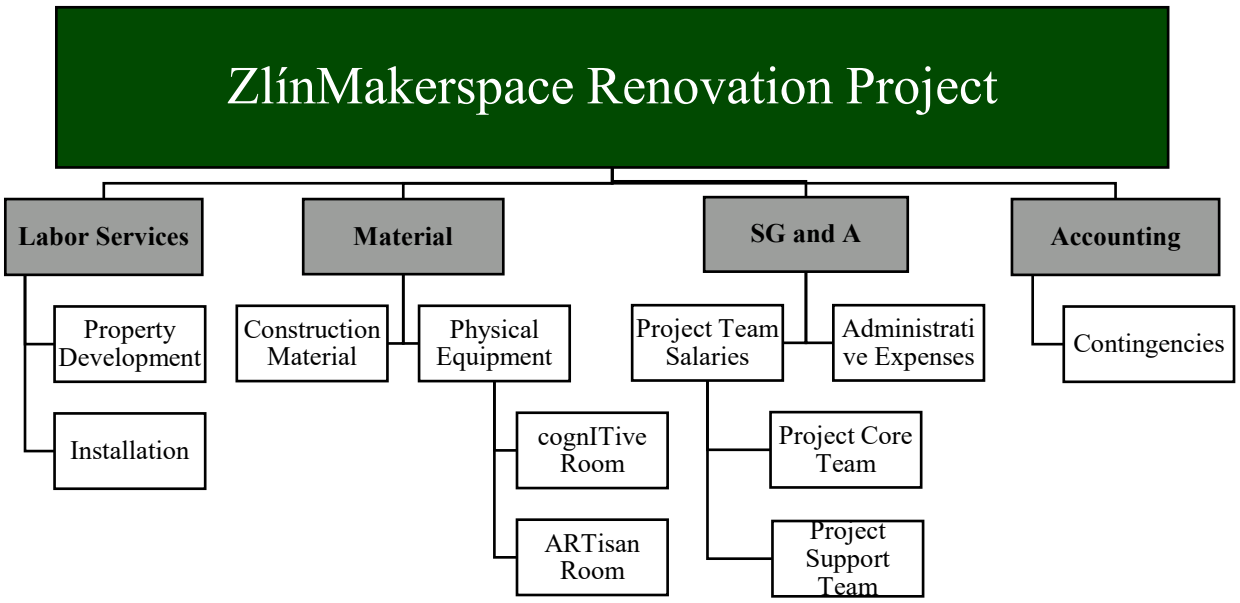


Figure 11: Cost Breakdown Structure – Cost Control Accounts

Cost Estimation

The identification and consideration of costing alternatives to address the needs of the project in terms of scope, schedule, resources and risks is essential to the project management process.

The project costs are defined as an effect of decisions taken to support project results and were estimated on the basis of the scope definition and information available at the early stage of the planning process (Project Management Institute, 2018).

The total project cost is estimated to be €100,000.00

Direct Costs

All direct costs attributable to the project are estimated through a parameter cost approach, developed from unit rates for common work activities and resources. The direct costs considered for this project are decomposed to a phase level and include labor expenses, management and material costs.

1. Direct labor expenses are the brought-in services specific to the project. They correspond to the outsourced labor for property development and installation phases and are estimated on the basis of hourly rates for each type of work and 8 hour shifts. The total hours required include a 12% margin to compensate for the personal time or idle work hours. Labor expenses account for 28% of the total project cost.
2. Direct management costs are those related to the project management activity or project workforce. They include salaries of the designated team through the overall duration of the project and will be charged to the project cost center. They are estimated on an hourly rate and represent 7% of the total project cost.
3. Direct material costs include the construction material required for the property renovation activity as well as the procurement of equipment and furniture to complete the installation and testing phases. Material costs account for 54% of the total project cost.

Indirect Costs

The indirect costs for this project are estimated in terms of administrative expenses and contingencies.

1. Administrative expenses may include equipment or materials used by the project team such as stationary, photocopies, computers and phones amongst others, as well as trainings and additional employee benefits. These expenses stand for 1% of the total project cost.

2. Contingency reserve is the allowance made for risks and costs uncertainties. It is allocated for identified risks including the availability of resources, logistics complications and delays on activities, additional work or rework, market stress and external factors that may impact the overall costs. Based on the risk analysis the project is defined as having a low-to-moderate risk and therefore only a 10% contingency rate is determined for the entire project.

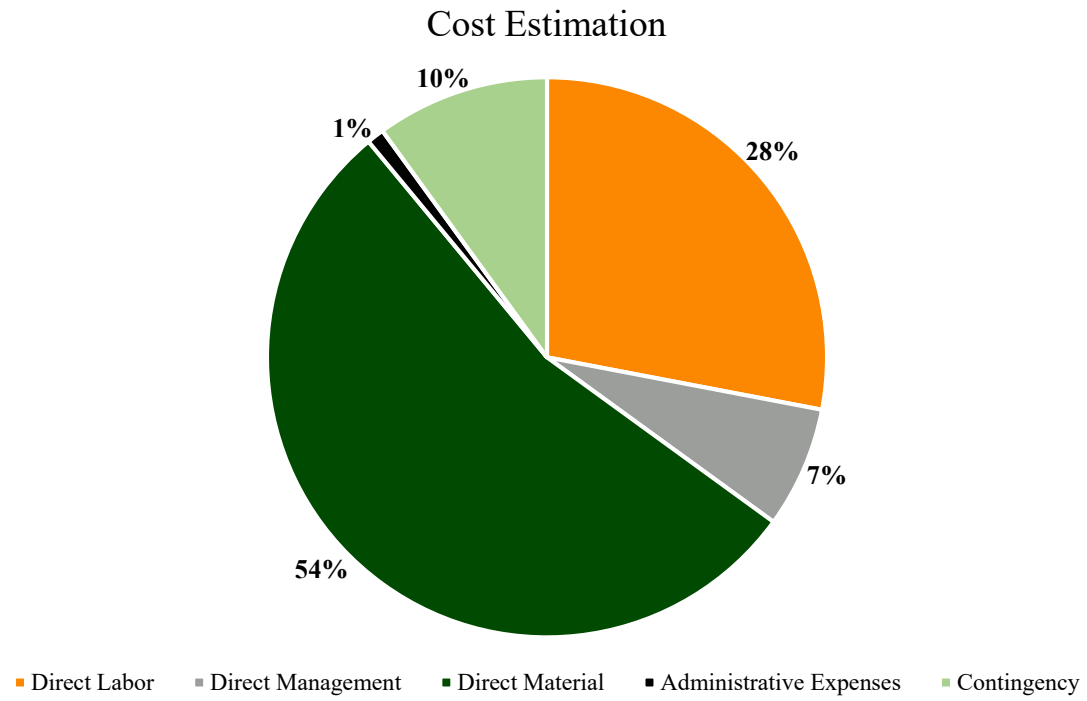


Figure 12: Cost Estimation in Percentage

Job Costing

The following table represents the cost estimation for each of the phases established in the work breakdown structure.

Phase	Labor	Materials	Manage-ment	Admin Expenses	Contingency	Total	% Over Total
Project Management			39.10	7.61	4.80	**51.86**	6
Property Analysis			1.16	0.23	0.14	**1.54**	0
Architectural Design			2.57	0.50	0.32	**3.41**	0
Property Development	240.00	350.00	9.92	1.93	66.63	**668.15**	78
Procurement		115.07	1.87	0.36	12.99	**130.23**	15
Installation	1.52		0.47	0.09	0.23	**2.31**	0
Testing			1.41	0.27	0.17	**1.87**	0
Total	**241.52**	**465.07**	**56.51**	**11.00**	**85.27**	**859.36**	**100**

Table 15: Job Costing

Each cost element was allocated to the corresponding phases according to their direct relation to the activities conducted throughout the project. The highest concentration of the project's cost is found within the property development phase and accounts for 78% of the total, followed by 15% and 6% related to the procurement and project management phases respectively. The remaining four phases represent only 1% of the total project cost.

Cash Flow Analysis

The cash flow for this project was developed from the estimated cash inflows and outflows throughout the duration of the project.

The cash inflows for this project are the payments received from ZlínMakerspace according to the contract which divides the total payment (including project costs and commissions for the realization of the project) in 2 parts. The first payment, accounting for half of the project's overall cost will be made at the end of the 5th month, and remaining part will be paid upon project completion.

The cash outflows are represented by the purchasing of materials, labor, salary and administrative expenses, and OID (other incomes and disbursements). The purchasing of materials and the cost of labour, starting from the third month on, assume constant values and are equally allocated along the total duration of the project. Salaries, paid at the end of each month vary in respect to the activities carried out through each phase.

Administrative expenses, or rather the expenditures related to day-to-day operation of the business, are assigned in the same amount for the entire project lifecycle, as well as the project contingencies (OID).

The net cash flow is simply calculated as cash inflows minus cash outflows over the given period. The cumulative cash flow consists on the sum of all net cash flows that are generated by a project since inception.

Risk Analysis
Identification of Risk

In the following, possible events that might affect the project and prevent the project team and stakeholders to achieve the earlier described project goals and objectives.

The tables 16 and 17 below lists the identified risks and opportunities respectively characterized by the cause which exists and leads to an effect that eventually forms the event (risk/opportunity) that may occur.

ID	RISK CATEGORY	CAUSE	EFFECT
ARCHITECTUAL DESIGN			
1.1	(Design of ZlínMakerspace with the three (3) defined areas)Architectural design (and floor plan) does not meet the strategic vision of the organization.	The design must place the IT room to the left, the do-it-yourself studio to the right and the store in the middle.	Team cannot fulfill expectations of client.
1.2	Design is infeasible.	Realization of design is not possible because it does not fit given property.	Budget or requirements have to be adjusted.
1.3	(Renovation of the property according to the architectural design)Property does not support the architectural design.	The location is in not good condition and does require major construction activities or changes to the structure and exterior, simply interior renovations.	Renovation requires larger, structural construction activities which are beyond the project scope. This will effect also time and cost.
1.4	Architecture fails to pass governance processes.	N/A	Design has to be changed.
PROPERTY			
2.1	Property cannot support the installation of the required equipment, tools and technology.	Resources do not fit within 2000 square meters.	Project cannot be finalized

TECHNOLOGY			
3.1	(Equipment, tools and technology tested and installed). Machines or other equipment cannot be set in state of operational functionality.	Machines or other equipment have security vulnerabilities.	Machines or equipment has to be exchanged which causes exceeded time and budget
ACCEPTANCE			
4.1	Handover of makerspace in state of operational functionality. Client rejects the final deliverable.	Customer is not satisfied with finalized makerspace or large parts of makerspace.	Time and costs have to be increased in order to satisfy customer.
COSTS			
5.1	(The project will be completed within budget of 100,000.00 €). Cost forecasts and estimates are inaccurate.	Poor planning.	Project cannot be delivered within budget.
5.2	(The project will be completed within budget of 100,000.00 €). Price of resources needed for the makerspace will increase beyond budgeted value.	Incomplete information of the market prices and cost of labor.	Project cannot be delivered within budget.
TIME			
6.1	(The project will be designed and implemented within a 6 month period). Time permitted for completing deliverables is exceeded.	Poor estimation of target time.	Delays
COMMUNICATION			
7.1	Project team misinterpreting the scope of work or misunderstand requirements.	Lacking information or the use of imprecise or vague language leads to confusion, ambiguity or misinterpretation.	Expectations of the client might not be fulfilled.
HUMAN RESOURCE			
8.1	(Sub-contract to high quality construction company for property development) Dependency on external participants, little influence on availability and quality.	No internal competencies	Forced to sub-contract
8.2	(Sub-contract to high quality construction company property development) Dependency on	No internal competencies	Forced to sub-contract

	external participants, little influence on availability and quality.		
8.3	(Efficient and high-quality project management) Lack of competencies of team. Team doesn't deliver in expected quality, causes extra costs or needs more time than scheduled to deliver tasks.	Team is inexperienced, because it is new to profession	Team tends to make more mistakes and be less productive.
9.1	Team fails to negotiate a reasonable price for resources.	Supplier has market power or team lacks negation skills and experience.	
9.2	(The project will be designed and implemented within a 11 month period.) Delays caused by supplier.	Late delivery or fail to meet requirements.	Delay of project due to late delivery or reordering.
9.3	(All resources can be obtained on the market) There is limited response to orders.	There are no or few suitable suppliers on the market.	Resources cannot be acquired on market or prices are too high.
SCOPE			
10.1	Scope creep or gold plating occurs.	Poor definition of the scope, uncontrolled changes requested by client and addition of not required features by team.	Growth of scope, which affects time and costs.
STAKEHOLDERS			
11.1	Inputs from stakeholders are low quality (e.g. business case, requirements, and change requests).	Stakeholders do not apply project management standards.	Stakeholders are not satisfied.
11.2	Stakeholders have inaccurate expectations.	No scope freeze.	Stakeholders are not satisfied.
RESOURCES			
12.1	General shortfalls of resources for the project.	Poor estimating.	Project cannot be continued or only by reducing quality.

Table 16: Risks Table

ID	OPPORTUNITY CATEGORY	CAUSE	EFFECT
TIME			
13.1	Project and/or phases can be delivered ahead of schedule.	Proper planning and use of project management tools, cooperation and clear communication.	Smooth processes, intermeshing phases.
BUDGET			
14.1	Project and/or partial deliverables consume fewer budget than estimated.	Beneficial market conditions exist and/or beneficial contracts can be signed. Experienced architect and high-quality supplier available.	Good prices and conditions, no or few rework.

Table 17: Opportunities Table

Qualitative Analysis

To classify and asses the listed risks and opportunities a qualitative analysis was conducted. Each risk and opportunity is assigned with a probability score and an impact score.

The risk/opportunity probability score ranges from 1 to 5. 1 is assigned to risks/opportunities which occur with a low probability between 0 and 20 %, whereas 5 is assigned to risks/opportunities which occur with high probability between 81 and 100 %.

The risk/opportunity impact score indicates the severity of changes caused by the risk/opportunity on the overall project. Score ranges from 1 to 5. 1 is assigned to risks/opportunities with low negligible impact, whereas 5 is assigned to risks/opportunities with severe impact.

The final assessment results from the multiplication of probability and impact score. This score indicates the importance of each risk/opportunity and helps the project management team to focus their attention and resource allocation on extreme and high risks/opportunities.

The classification is based on past experience and qualitative assessment. The result of the qualitative analysis is presented in Table 18.

ID	Probability	Impact	Score (PxI)
1.1	1	4	**4**
1.2	1	3	**3**
1.3	2	4	**8**
1.4	1	5	**5**
2.1	1	5	**5**
3.1	2	4	**8**
4.1	1	5	**5**
5.1	1	4	**4**
5.2	2	4	**8**
6.1	1	5	**5**
7.1	2	3	**6**
8.1	2	5	**10**
8.2	2	5	**10**
8.3	2	3	**6**
9.1	1	4	**4**
9.2	2	5	**10**
9.3	1	5	**5**
10.1	1	5	**5**
11.1	1	4	**4**
11.2	1	4	**4**
12.1	2	5	**10**
13.1	2	3	**6**
14.1	1	4	**4**

Table 18: Qualitative Analysis of Project Risks

The matrix below (Table 19) plots the previous assigned probability against the impact of the risks and opportunities. They are quantified according to the assigned score into five categories: minimum, low, moderate, high and extreme.

		IMPACT				
		(1) Negligible	**(2) Minor**	**(3) Moderate**	**(4) Significant**	**(5) Severe**
PROBABILIT	**(5) 81-100**	Low	Moderate	Moderate	Extreme	Extreme
	(4) 61-80	Low	Low	Moderate	High	Extreme
	(3) 41-60	Minimum	Low	Moderate	High	High

	(2) **21-40**	Minimum	Low	Low 7.1, 8.3, 13.1	Moderate 1.3, 3.1, 5.2	High 8.1, 8.2, 9.2, 12.1
	(1) **0-20**	Minimum	Minimum	Low 1.2	Moderate 1.1, 5.1, 9.1, 11.1, 11.2, 14.1	High 1.4, 2.1, 4.1, 6.1, 9.3, 10.1

Table 19: Probability and Impact Matrix

As visually demonstrated in the matrix, most of the risks are classified as moderate and high risk due to the significant or severe impact of the identified risks. The opportunity to deliver ahead of time is low, whereas the opportunity to realize with fewer budget than estimated is moderate.

Risk Response

In order to respond to the identified risks a mitigation action for each risk has been developed, which has to be taken in case of occurrence of the risk (Table 20). The mitigation action reduces the probability and impact of each risk. In addition, a responsible person or division is assigned to every risk and is in charge of managing and responding the risk (Project Management Institute, 2018).

Other risk response techniques such as eliminating, deflecting or accepting the risks were not assessed as suitable risk responses in case of ZlínMakerspace since all risks are low, moderate or high and can be managed efficiently with mitigation actions.

ID	Risk CATEGORY	Score (PxI)	Mitigation Action	Responsible
ARCHITECTUAL DESIGN				
1.1	(Design of ZlínMakerspace with the three (3) defined areas)Architectural design (and floor plan) does not meet the strategic vision of the organization.	4	Communication channels needs to be strengthened to ensure that the vision is adequately expressed. Regular meetings between the deign team and client will also be conducted to ensure that the design is maintaining the strict design guidelines.	Team Leader (Indoor Design) and Team Leader (Outdoor Design)
1.2	Design is infeasible.	3	Feasibility study will be conducted.	Team Leader for Property Analysis

1.3	(Renovation of the property according to the architectural design)Property does not support the architectural design.	8	Conduct property analysis study prior to the design phase.	Team Leader for Property Development
1.4	Architecture fails to pass governance processes.	5	Review architectural design.	Team Leader (Indoor Design) and Team Leader (Outdoor Design)
PROPERTY				
2.1	Property cannot support the installation of the required equipment, tools and technology.	5	Ensure a property analysis study is conducted to determine the capacities of the property prior to the procurement.	Team Leader for Property Analysis
TECHNOLOGY				
3.1	(Equipment, tools and technology tested and installed). Machines or other equipment cannot be set in state of operational functionality.	8	Plan, budget and ensure procurement of high-quality and certified machines and equipment.	Negotiator for Installation
ACCEPTANCE				
4.1	Handover of makerspace in state of operational functionality. Client rejects the final deliverable.	5	Implement feasible changes in scope. Ensure open and transparent communication with client and acceptance of work on regular basis.	Project Manager
COSTS				
5.1	(The project will be completed within budget of 100,000.00 €). Cost forecasts and estimates are inaccurate.	4	Cash-flow analysis and communication with supplier.	Financial Analyst
5.2	(The project will be completed within budget of 100,000.00 €). Price of resources needed for the makerspace will increase beyond budgeted value.	8	Purchase the goods in advance with flexible contract terms that will allow for the best price allocation.	Negotiators (Procurement Department)

TIME				
6.1	(The project will be designed and implemented within a six (6) month period). Time permitted for completing deliverables is exceeded.	5	Careful scheduling and the use of PM techniques such as CPM are required and have to be controlled throughout the project.	Project Manager
COMMUNICATION				
7.1	Project team misinterpreting the scope of work or misunderstand requirements.	6	Use precise and clear language. Close communication with client.	Project Manager
HUMAN RESOURCE				
8.1	(Sub-contract to high quality construction company for property development). Dependency on external participants, little influence on availability and quality.	10	Forecast necessary resources to ensure availability. Examine qualification of architect.	Team Leader for Property Development
8.2	(Sub-contract to high quality construction company property development). Dependency on external participants, little influence on availability and quality.	10	Forecast necessary resources to ensure availability. Examine qualification of construction company.	Team Leader for Installation
8.3	(Efficient and high-quality project management). Lack of competencies of team. Team doesn't deliver in expected quality, causes extra costs or needs more time than scheduled to deliver tasks.	6	Offer trainings and ensure transfer of knowledge and communication to experienced employees.	PM (Core and Support) Team
CONTRACT/PROCUREMENT				
9.1	Team fails to negotiate a reasonable price for resources.	4	Offer trainings and ensure transfer of knowledge and communication to experienced employees.	Negotiators (Procurement Department)
9.2	(The project will be designed and	10	Ensure qualification of supplier.	Negotiators (Procurement

	implemented within a 6 month period). Delays caused by supplier.			Department) and Legal Specialist
9.3	(All resources can be obtained on the market). There is limited response to orders.	5	Define reasonable equipment for makerspace with client. Purchase the goods in advance with flexible contract terms that will allow for the best price allocation.	Negotiators (Procurement Department)
SCOPE				
10.1	Scope creep or gold plating occurs.	5	Implement change request forms and compliance and increase time and budged accordingly.	Project Manager
STAKEHOLDERS				
11.1	Inputs from stakeholders are low quality (e.g. business case, requirements, and change requests).	4	Clear communication of requirements and scope throughout all phases and departments.	Project Manager
11.2	Stakeholders have inaccurate expectations.	4	Clear communication of requirements and scope throughout all phases and departments.	Project Manager
RESOURCES				
12.1	General shortfalls of resources for the project.	10	Careful budgeting and estimation ahead of time. Avoidance of waste of resources. Emphasis respectful use of resources among all stakeholders of project	Negotiators (Procurement Department)

Table 20: Risk Plan

ID	Opportunity CATEGORY	Score (PxI)	Enhancement Action	Responsible
TIME				
13.1	Project and/or phases can be delivered ahead of schedule.	6	Avoid unnecessary expansion of time due to reduction of effort. Rescheduling to ensure level of effort and incorporate time advantage.	Project Manager
BUDGET				
14.1	Project and/or partial deliverables consume fewer budget than estimated.	4	Save money and add to contingency budget.	Project Manager

Table 21: Mitigation Plan

In order to respond to the identified opportunities, the assigned responsible person has to enhance the opportunity. Since there is only one low and moderate opportunity identified, other strategies such as exploiting, sharing or accepting the opportunity are less suitable.

Risk Control

Especially at the beginning of the project, during the concept and design phase, there is a high degree of uncertainty. Although the described Risk Management Plan is a useful and necessary tool to cope with risk throughout the project, this risk is significant high at the outset of the project and decreases as the project progresses. However, during the last to phases of the Project-Life-Cycle, where the level of influence is low and the cost to change is high, the impact of risk is the highest. Therefore, risk identification is a continuous process and risk has to be constantly controlled until the project is completed (Project Management Institute, 2018).

Therefore, processes of tracking and monitoring identified risks as well as identifying and evaluation new risks throughout the project, have to be implemented by the project management team. The Risk Management Plan will be monitored and updated on a regular basis by the same means used in the presented Risk Management Plan as well as meetings with persons in charge and variance analysis.

Project Control

Overview

The project control process is a structured approach which oversees all the tasks which are to be performed within a project and ensures that the approved and authorized activities are in line with the scope, in time and on budget so that the project proceeds under minimal risks (Project Management Institute, 2018). In general terms, project control provides an overview of the instruments used to control and manage the implementation of the ‘ZlínMakerspace Renovation Project’, addressing the following key elements:

Baseline Plan

The baseline plan refers to the approved ZlínMakerspace Renovation project plan. It is used as a rigid tool to measure and control project activities which during the execution phase of the project are updated as deemed necessary (Project Management Institute, 2018). The project baseline plan indicates the path that ZlínMakerspace Renovation plan should follow and in addition it indicates the basic guidelines for managing the scope, schedule and planned budged.

Scope Management

Scope statement outlines the content of the project by stating the problem and the solution. It identifies all the work that has to be carried in terms of meeting the clients' needs. In order to avoid major scope changes the Configuration Management System was introduced to the project. The system aims to keep track of the proposed changes which are categorized in accordance with their appropriateness (Project Management Institute, 2018).

The scope management is designed to ensure that the project team can make decisions in in time and on budget, in accordance with specific requirements. The scope management is accomplished by the following processes:

- Provide a Work Breakdown Structure (WBS) that defines the project and the scope from the top project level to detailed manageable work packages. An accompanying schedule and budget are developed and responsibilities are assigned for each work package.
- Obtain information in terms of cost and time in order to expand to the level of detail necessary to meet management and reporting requirements.
- Throughout the execution phase of the project, integrate the submitted data and compare the project progress versus planned specifications.
- Analyze and evaluate the results; identify key problems which require corrective actions be taken.
- Analyze, control and evaluate changes which affect the work scope, budget and time.

Cost Management

ZlínMakerspace Renovation Project has an assigned budget of €100,000.00. In order to ensure that the project is delivered within the cost expectations highlighted in the project definition, consistent measures and comparisons will be carried out. If necessary positive actions to retain control of project's costs will be taken. In order to monitor and control the cost of the project, techniques such as Earned Value Management and Estimating will be used throughout the all phases (Project Management Institute, 2018). To determine the cost variances at all project phases, comparisons will be drawn in between the authorized planned value and earned value.

Time Management

In order to develop a projected baseline schedule, the ZlínMakerspace project team has researched and obtained historical data from the market. The deadline for the closure and the handover of the project is 01 March 2019. The project will start on 01 April 2018, indicating a duration of eleven (11) months or 240 days in total, pertaining the fact that Saturdays and Sundays are listed as holidays. While developing and maintaining the schedule several factors such as delays, procurement time, resource availability constrains and equipment failures are taken into consideration. Furthermore, the critical path of the project is to be maintained on real – time basis (Project Management Institute, 2018).

Document Control

In order to successfully complete key activities and the ZlínMakerspace project in overall terms, it is of a crucial importance to ensure that all documentation adhere to contractual, safety and regulatory rules as agreed upon with the project sponsor (Project Management Institute, 2018). To ensure the handover of documents during the project closure, a proper strict archiving system has been put in place.

Procurement Management

ZlínMakerspace Renovation Project requires special attention in managing and monitoring the relationships with the suppliers and contracts due to the involvement of different stakeholders. ZlínMakerspace project has a procurement department which specifically handles the contract

administration and corrective actions which may be taken if deemed necessary. If changes occur, they have to go through the Integrated Change Control process and are integrated in the updated in the project management plan (Project Management Institute, 2018).

Change Control

Change within the project may come from internal and external forces; therefore, having a common and systematic process which identifies, evaluates and controls potential changes is very important for ZlínMakerspace Renovation Project. For changes to be applied in the ZlínMakerspace project, the following steps should be taken:

1. Change order must be identified, categorized and entered into the system;
2. An impact analysis which includes a various projects aspects (e.g time, cost, scope, benefits, quality, risks) should be carried by team experts in the field;
3. Impacts are translated within the framework of project performance, cost and schedule;
4. Possible alternatives with similar outcomes should be taken into consideration;
5. A decision whether to implement or decline the change is taken by the people who are authorized to approve/decline change requests (Malenovsky and Duspivova, 2012);
6. Approved changes are communicated to all concerned parties;
7. Proper implementation of the change is ensured;
8. Evaluation report is compiled emphasizing the direct impact of the change in the project.

Communication Management

Communication and flow of information is of a crucial importance for the successful implementation of the ZlínMakerspace Renovation Project. The control of information among the project manager and team members as well as suppliers will be carried through defined lines of communication, distribution lists and regular meetings. As a mean of controlling all the transmitted information, minutes of meetings will be taken and archived for further reference (Project Management Institute, 2018).

Human Resources Management and Performance Evaluation

ZlínMakerspace Renovation Project has a clear organization structure which underlines the functions and positions of each assigned team member. For internal purposes of the project, job descriptions are developed as a guideline for the employee and employer.

On monthly basis, budgeted cost of work scheduled will be compared against the actual cost of work performed and the actual work completed. The project management performance will be conducted in order to track the productivity of the team, identify potential risks and evaluate the project in terms of budget and time (Project Management Institute, 2018).

Project Closure

Project Closure Overview

Project closure phase involves the process of communicating the closure of the project to all key stakeholders and the handover of the final deliverables, including documents, contracts, and project resources (Project Management Institute, 2018).

Special emphasis was placed during the early planning phase of the project on the i) Acceptance Criteria, ii) Effective Communication and iii) Continual Assistance in order to ensure a smooth transition and proper handling of the project closure.

Acceptance Criteria

The acceptance criteria serves as a baseline and measurement in comparing the final project deliverables with what has been agreed upon during the planning phase (Project Management Institute, 2018). Acceptance Criteria has been defined during the early planning phase of the project in close coordination with the sponsor of the project and other key stakeholders who play a major role in the project execution. The deliverables, expectations and requirements have been set while planning the acceptance criteria.

Effective Communication

Frequent interaction throughout the project in between key stakeholders assists in a smother project closure process. In order to avoid unexpected problems at the end, the status of the project including the expected completion dates and other major issues were communicated on regular basis. The project communication lines and procedures have been set during the planning phase when the project charter was being developed (Project Management Institute, 2018).

Continual Assistance

Bearing in mind that the project sponsor is always concerned about progress of the project, support on frequent detailed inspections has been offered to increase project sponsor's confidence and avoid any delays during the closure phase (Project Management Institute, 2018)

Once the transition in between the execution phase and closure has started, the contracted team will draft the Project Closure Report (Appendix 7). It is of a very high importance to list all the undertaken activities which are key to the project closure. The project report will indicate a description of the project closure report purpose and report summary, project metrics performance (i.e. goals and objectives performance, success criteria performance, milestone and deliverables performance, schedule performance and budget performance); project closure tasks (resource management, risk management, communication management, customer expectation management and lessons learned) and the approval signature from the contracting party.

The project closure phase was planned as from the start of the project where procedures and required documents were compiled. It requires 98 hours of work in total which will be divided among team members, respectively between the project manager, project assistant and legal analyst. The project manager will dedicate 40 hours of work, project assistant 34 hours of work, and legal assistant 24 hours in total.

Post Implementation Review

Once ZlínMakerspace has started operating and experiencing the benefits of the renovation, the contracted team will complete a Post Implementation Review in order to identify the level of the success and lessons learned for future reference.

Conclusion

The following chapter provides the concluding remarks of the thesis, which were extracted based on the current literature and practical process of the development of a makerspace in Zlín.

This thesis aims to explore the extant literature in makerspaces and the evolution of the phenomena over time. It goes further in validating the need of a makerspace in Zlin and building a detailed project proposal, which for practitioners and researchers in the field will serve as a baseline guide. The thesis starts with explaining literature choices as well as philosophical stances of the researcher in terms of ontology, epistemology and axiology. It goes on further in highlighting the reasons why the city of Zlín needs a makerspace by outlining the creating culture of the city, the lack of a collaborative area for individuals in general, but, especially for students who attend Tomas Bata University. In terms of the theory, it was important to create an understanding of the definition, types and set-up of the makerspaces. A deep understanding was also created on the historical development of the makerspaces, by looking at two historical phases, the emerging period covering years from 1800s until 1990s and the evolution period from 1990s to date.

Market validation shows that this is a great opportunity for Zlín but also for the business owners. Interviewed representatives from the Tomas Bata University, including students but also citizens of Zlín, argue that Zlín needs a place which will bring together like-minded people to work on innovative projects. Students also add that the makerspace will have a huge impact on education, encourage curiosity and establish an appetite for challenges. The positive feedback shapes the opportunity to introduce the concept of a makerspace in Zlín.

Further on during the thesis, the business concept is outlined, including the mission, vision and values of the business. Special emphasis is placed in structuring how the business model works and defining customer segmentation. The makerspace in Zlín will be open to everyone who enjoys sharing knowledge and building ranging from students, individuals and organizations. To stand out from the rest, the value proposition is states very clearly that the makerspace will be a place where the fear of trial and error will eliminate through support and hands-on learning. Detailed planning has allowed to also build a timing analysis for the process of building the location of the makerspaces, thus requiring 11 months of intensive work. The works are planned to commence in

April 2018 and finish in March 2019. The cost for the completion of the works is estimated to reach €100,000.00. The business risks are highly correlated to the development of the location itself rather than the idea of building a makerspace. The thesis enlists several potential risks which may occur in a specific point of time, by diving them in specific categories, scores, mitigation actions as well as adding the team member responsible for the specific risk.

In conclusion, the establishment of a makerspace in Zlín is of high relevance for its community as it will offer a space for creating and building to individuals for who the costs related to access to resources would otherwise be unattainable. The ZlínMakerspace will promote academic achievements, enhance competition as well as improve social support. Last but not least, the concept of makerspaces is relatively new, therefore, this thesis will contribute to the extant research and will serve as a guide for anyone who is interested in building a makerspace within their local community.

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APPENDIXES

APPENDIX 1 – LIST OF EQUIPMENT AND SUPPLIES

cognITive room

ARTisan room

Software

- Auto CAD
- REVIT
- Rhinoceros +Grasshopper
- Sketchup
- Adobe Creative Suite

3D Printer

- Stereolithography 3D Printer
- Thermoplastic resin 3D printer

Development Kits

- Arduino
- Rasbery Pi
- Littlebits

Multifunction Printer

- Xerox WorkCentre 4260

CNC Mill

- Shapeoko 2

CNC Router

- Complete A4 Ballscrew KIT CNC Engraving Milling Router

Laser Cutter

- Laser-script LS3020 Pro

Sewing

- Singer 7465 Sewing Machines
- Sewing Kits
- Thread
- Splice set
- Fabric Scissors
- Iron
- Snap setter serger

General Tools and Equipment

- Tool Kits
- Staple gun, Hot-glue gun

Safety

- Earmuffs/Ear plugs
- Safety glasses/goggles
- Disposable gloves

Accessories

- Aprons
- Tool cabinet and rolling tool box

Consumables

- Knives and blades
- Sanding tools
- Glues (super, wood …)
- Tapes
- Pens and pencils
- Markers, pastels …
- Paints
- Paint brushes
- Papers
- Strings, yarn …
- Smash Data Stamp

- Woods
- Nails, screws, nuts, bolts …
- Plastics, Metals and Textiles

APPENDIX 2A – WORK BREAKDOWN STRUCTURE

1. PROJECT MANAGEMENT
1.1. Planning
1.1.1. Conducting Planning Activities
1.2. Meetings
1.2.1. Create Meeting Schedule
1.2.2. Conduct Meetings
1.2.3. Produce Meeting Notes for Control
1.3. Administration
1.3.1. Conducting Administrative Activities

2. PROPERTY ANALYSIS
2.1. Property Analysis Plan
2.1.1. Define Critical Areas for Inspection
2.1.2. Develop Analysis Report
2.1.3. Create Schedule for Inspection
2.2. Property Analysis Execution
2.2.1. Execute Property Inspection
2.2.2. Analyze Results
2.2.3. Define and Rank Areas in Need of Development

3. ARCHITECTURAL DESIGN
3.1. Technical Architecture
3.1.1. Identify Physical Capacity
3.1.2. Determine Design Requirements
3.2. Technical Standards
3.2.1. Define Technical Standards for cognITive Room
3.2.2. Define Technical Standards for ARTisan Room
3.2.3. Define Technical Standards for MyShop
3.2.4. Define Technical Standards for Common Areas
3.2.5. Define Technical Standards for Outdoor Grounds
3.3. Schematic Design
3.3.1. Design cognITive Room
3.3.2. Design ARTisan Room
3.3.3. Design MyShop
3.3.4. Design Common Areas
3.3.5. Design Outdoor Grounds
3.4. Design Proposal
3.4.1. Propose Design to Stakeholders
3.4.2. Negotiate Changes to Design
3.5. Design Development
3.5.1. Develop Approved Design

3.6. Final Design Proposal
3.6.1. Propose Final Design to Stakeholders
3.7. Design Approval
3.7.1. Approve Final Design

4. PROPERTY DEVELOPMENT
4.1. Planning
4.1.1. Define and Rank Renovation Activities Based on Property Analysis Results and Developed Floorplan
4.1.2. Create Timeframe
4.2. Execution
4.2.1. Conduct Internal Renovations
4.2.2. Conduct External Renovations

5. PROCUREMENT
5.1. Planning
5.1.1. Identify Resources for Property Development
5.1.2. Identify Resources for Installation
5.1.3. Create Order Timeframe
5.1.4. Gather Price Quotations
5.2. Orders
5.2.1. Choose Suppliers
5.2.2. Define and Sign Purchase Orders
5.3. Delivery and Inspection
5.3.1. Receive Deliveries for Property Development
5.3.2. Receive Deliveries for Installation

6. INSTALLATION
6.1. cognITive Room
6.1.1. Install Furniture
6.1.2. Install Physical Equipment
6.1.3. Install Software
6.1.4. Install Bulk Materials
6.2. ARTisan Room
6.2.1. Install Furniture
6.2.2. Install Physical Equipment
6.2.3. Install Tools
6.2.4. Install Bulk Materials
6.3. MyShop
6.3.1. Install Furniture
6.3.2. Install Physical Equipment
6.3.3. Install Bulk Materials
6.4. Common Areas

6.4.1. Install Furniture
6.4.2. Install Bulk Materials

7. TESTING
7.1. System Test
7.1.1. Establish System Test Plans and Procedures
7.1.2. Conduct System Testing
7.2. Corrective Actions
7.2.1. Take Corrective Actions
7.2.2. Conduct System Retest
7.3. Acceptance Test
7.3.1. Establish Acceptance Test Plans
7.3.2. Conduct Acceptance Testing

APPENDIX 2B – WORK BREAKDOWN STRUCTURE; EXTENDED

1. PROJECT MANAGEMENT
1.1. Planning
1.1.1. Conducting Planning Activities
1.2. Meetings
1.2.1. Create Meeting Schedule
1.2.2. Conduct Meetings
1.2.3. Produce Meeting Notes for Control
1.3. Administration
1.3.1. Conducting Administrative Activities

2. PROPERTY ANALYSIS
2.1. Property Analysis Plan
2.1.1. Define Critical Areas for Inspection
2.1.2. Develop Analysis Report
2.1.3. Create Schedule for Inspection
2.2. Property Analysis Execution
2.2.1. Execute Property Inspection
2.2.1.1. Analyze Physical Condition
2.2.1.1.1. Inspect Internal Physical Condition
2.2.1.1.1.1. Inspect Internal Amenities
2.2.1.1.1.2. Inspect Services
2.2.1.1.1.2.1. Analyze Electrical Systems
2.2.1.1.1.2.2. Analyze Fluid Systems
2.2.1.1.2. Inspect External Physical Condition
2.2.1.2. Analyze Functional Condition
2.2.1.2.1. Inspect Internal Functional Condition
2.2.1.2.1.1. Inspect Internal Amenities
2.2.1.2.1.2. Inspect Services
2.2.1.2.1.2.1. Analyze Electrical Systems
2.2.1.2.1.2.2. Analyze Fluid Systems
2.2.1.2.2. Inspect External Functional Condition
2.2.1.3. Determine Health and Safety Requirements
2.2.2. Analyze Results
2.2.2.1. Analyze Results of Physical Condition Inspection
2.2.2.2. Analyze Results of Functional Condition Inspection
2.2.2.3. Analyze Results of Health and Safety Requirements Report
2.2.3. Define and Rank Areas in need of Development

3. ARCHITECTURAL DESIGN
3.1. Technical Architecture

3.1.1. Identify Physical Capacity
3.1.1.1. Analyze Physical Blueprints
3.1.1.2. Consult Property Analysis Reports
3.1.2. Determine Design Requirements
3.1.2.1. Meet with Stakeholders
3.1.2.2. Identify Design Requirements
3.1.2.3. Create Schedule for Design Completion
3.2. Technical Standards
3.2.1. Define Technical Standards for cognITive Room
3.2.2. Define Technical Standards for ARTisan Room
3.2.3. Define Technical Standards for MyShop
3.2.4. Define Technical Standards for Common Areas
3.2.5. Define Technical Standards for Outdoor Grounds
3.3. Schematic Design
3.3.1. Design cognITive Room
3.3.1.1. Incorporate Computer Hub
3.3.1.2. Incorporate Printing Area
3.3.1.3. Incorporate Dark Room and Photo Development Area
3.3.1.4. Incorporate General Work Area
3.3.2. Design ARTisan Room
3.3.2.1. Incorporate Sewing Area
3.3.2.2. Incorporate Woodshop
3.3.2.3. Incorporate General handicraft Space
3.3.2.4. Incorporate Clean Up Space (Sink Area)
3.3.3. Design MyShop
3.3.3.1. Design Shelving Unit Layout
3.3.3.2. Incorporate Back Room
3.3.3.3. Incorporate Cash Area
3.3.4. Design Common Areas
3.3.4.1. Incorporate Reception
3.3.4.2. Design Recycling Room
3.3.4.3. Design Café
3.3.5. Design Outdoor Grounds
3.4. Design Proposal
3.4.1. Propose Design to Stakeholders
3.4.2. Negotiate Changes to Design
3.5. Design Development
3.5.1. Develop Approved Design
3.6. Final Design Proposal
3.6.1. Propose Final Design to Stakeholders
3.7. Design Approval
3.7.1. Approve Final Design

4. PROPERTY DEVELOPMENT
4.1. Planning
4.1.1. Define and Rank Renovation Activities Based on Property Analysis Results and Developed Floorplan
4.1.1.1. Define Tasks for Indoors Property Development
4.1.1.1.1. Identify Indoor Amenities Requirements
4.1.1.1.2. Identify Services Requirements
4.1.1.2. Define Tasks for Outdoor Property Development
4.1.1.2.1. Identify Exterior Finishing and Roof Requirements
4.1.1.2.2. Identify Landscaping Requirements
4.1.1.2.3. Identify Parking Lot Requirements
4.1.2. Create Timeframe
4.2. Execution
4.2.1. Conduct Internal Renovations
4.2.1.1. Renovate Internal Amenities
4.2.1.2. Renovate Services
4.2.2. Conduct External Renovations
4.2.2.1. Renovate Exterior Finishing and Roof
4.2.2.2. Implement Landscape Design
4.2.2.3. Develop Parking Lot

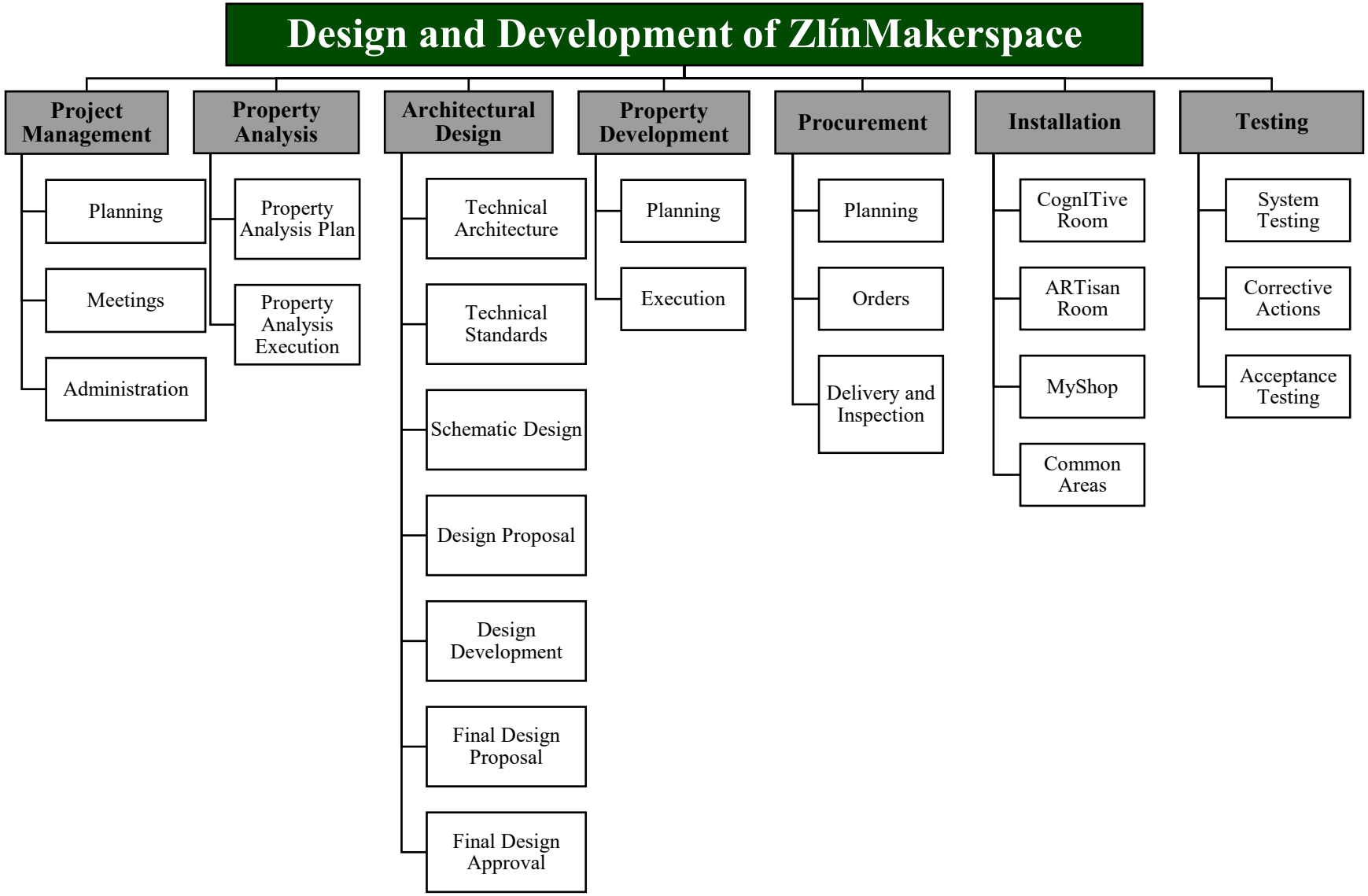
5. PROCUREMENT
5.1. Planning
5.1.1. Identify Resources for Property Development
5.1.1.1. Identify Amenities for Internal Property Development
5.1.1.2. Identify Amenities for External Property Development
5.1.2. Identify Resources for Installation
5.1.2.1. Identify Furniture Needed
5.1.2.2. Identify Physical Equipment Needed
5.1.2.3. Identify Software Needed
5.1.2.4. Identify Bulk Materials Needed
5.1.3. Create Order Timeframe
5.1.4. Gather Price Quotations
5.2. Orders
5.2.1. Choose Suppliers
5.2.2. Define and Sign Purchase Orders
5.3. Delivery and Inspection
5.3.1. Receive Deliveries for Property Development
5.3.2. Receive Deliveries for Installation

6. INSTALLATION
6.1. cognITive Room
6.1.1. Install Furniture
6.1.1.1. Install Tables

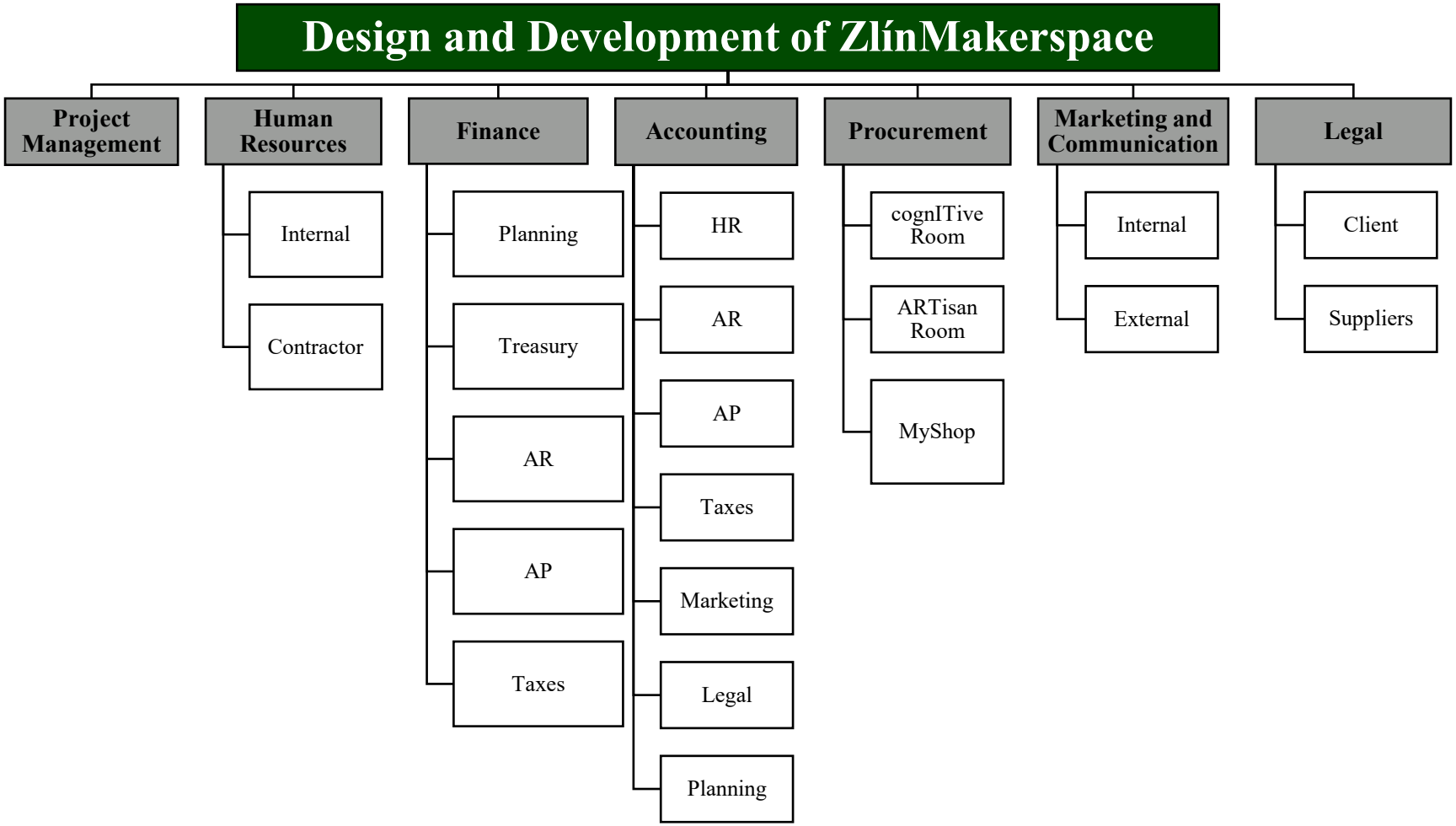
6.1.1.2. Install Chairs
6.1.1.3. Install Storage Units
6.1.1.4. Install Other
6.1.2. Install Physical Equipment
6.1.2.1. Install Printers
6.1.2.2. Install Computers
6.1.2.3. Install Projectors
6.1.2.4. Install other
6.1.3. Install Software
6.1.4. Install Bulk Materials
6.2. ARTisan Room
6.2.1. Install Furniture
6.2.1.1. Install Workbenches
6.2.1.2. Install Chairs
6.2.1.3. Install Storage Units
6.2.1.4. Install Easels
6.2.1.5. Install Other
6.2.2. Install Physical Equipment
6.2.2.1. Install Machines
6.2.2.2. Install Tools
6.2.3. Install Tools
6.2.4. Install Bulk Materials
6.3. MyShop
6.3.1. Install Furniture
6.3.2. Install Physical Equipment
6.3.3. Install Bulk Materials
6.4. Common Areas
6.4.1. Install Furniture
6.4.2. Install Bulk Materials

7. TESTING
7.1. System Test
7.1.1. Establish System Test Plans and Procedures
7.1.2. Conduct System Testing
7.2. Corrective Actions
7.2.1. Take Corrective Actions
7.2.2. Conduct System Retest
7.3. Acceptance Test
7.3.1. Establish Acceptance Test Plans
7.3.2. Conduct Acceptance Testing
7.3.3. Receive Formal Acceptance

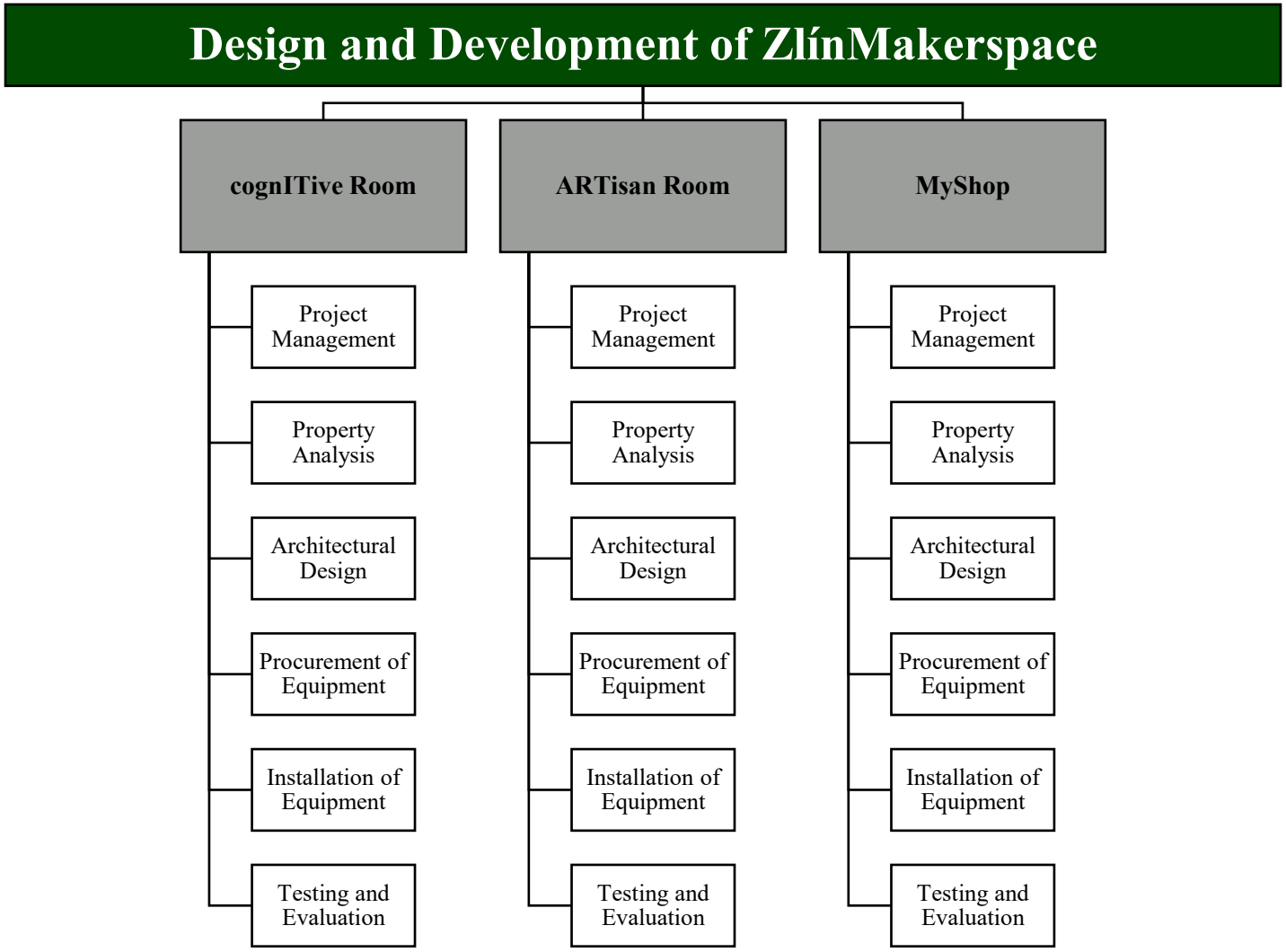
APPENDIX 2C - WORK BREAKDOWN STRUCTURE (PHASE); VISUAL



APPENDIX 3 – WBS BY FUNCTIONAL UNIT



APPENDIX 4 - WBS BY ORGANIZED AREA



APPENDIX 5 - HUMAN RESOURCE USAGE FOR PROJECT

Week	Project Manager	Project Assistant	Team Leader (Indoor Design)	Team Leader (Outdoor Design)	Team Leader for Property Analysis	Team Leader for Property Development	Team Leader for Installation	Financial Analyst	Negotiator for Property Development	Negotiator for Installation	Administration	Legal Specialist	TOTAL
1	24	17.38			12		2	4.8			21.07	19.2	**100.45**
2	21.6	11.3			20			8			32.35	14.4	**107.65**
3	32	27.3			32			8			21.27	8	**128.57**
4	36.8	27.3	8	8	8			8			21.27	8	**125.37**
5	32	27.3	16	30				8			21.27	8	**142.57**
6	32	27.3	10					8			21.27	8	**106.57**
7	35.2	29.3	11	7				8			21.27	8	**119.77**
8	33.6	29.3	16	16				8			21.27	8	**132.17**
9	32	27.3	6	6	24	14	8	8	16	16	21.27	8	**186.57**
10	32	27.3				24		8	8	8	29.27	8	**144.57**
11	32	20						8	24	16	10.85	19.2	**130.05**
12	32	20				32			8		10.85		**102.85**
13	32	20				40					10.85		**102.85**
14	32	20				40					10.85		**102.85**
15	30.8	20				40					10.85		**101.65**
16	20	20				40					10.85		**90.85**
17	20	20				40					10.85		**90.85**
18	20	20				24					10.85		**74.85**
19	20	20				20					10.85		**70.85**
20	20	20				20					10.85		**70.85**
21	20	20				20					10.85		**70.85**

22	20	20				20					10.85		**70.85**
23	20	20				20					10.85		**70.85**
24	20	20				20					10.85		**70.85**
25	20	20				20					10.85		**70.85**
26	20	20				20					10.85		**70.85**
27	20	20				20					10.85		**70.85**
28	20	20				20					10.85		**70.85**
29	20	20				20					10.85		**70.85**
30	20	20				20					10.85		**70.85**
31	20	20				20					10.85		**70.85**
32	20	20				20					10.85		**70.85**
33	20	20				20					10.85		**70.85**
34	20	20				20					10.85		**70.85**
35	20	20				20					10.85		**70.85**
36	20	20				20					10.85		**70.85**
37	20	20				20					10.85		**70.85**
38	20	20				20					10.85		**70.85**
39	20	20				20					10.85		**70.85**
40	20	20				20					10.85		**70.85**
41	20	20				20					10.85		**70.85**
42	20	20				20					10.85		**70.85**
43	20	20				20					10.85		**70.85**
44	20	20				20					10.85		**70.85**
45	20	20				20					10.85		**70.85**
46	20	20				20	16			16	10.85		**102.85**
47	20	23.33				20	24				10.85		**98.18**
48	20	34.67				4					10.85		**69.52**
49	24	23									4.33	8	**59.33**
50	16	8											**24**
TOTAL	**1170**	**1060.08**	**67**	**67**	**96**	**878**	**50**	**84.8**	**56**	**56**	**648.21**	**124.8**	**4357.89**

APPENDIX 6 - TIME MANAGEMENT OF PROJECT ACTIVITIES

ID	Task Name	Duration	Start	Finish	Predecessors
1	PROJECT MANAGEMENT	240 days	01/04/18	01/03/19	
1.1	Planning	48 days	01/04/18	05/06/18	
1.1.1	Conducting Planning Activities	72.5 days	01/04/18	10/07/18	
1.2	Meetings	240 days	01/04/18	01/03/19	
1.2.1	Create Meeting Schedule	7 days	01/04/18	09/04/18	
1.2.2	Conduct Meetings	235 days	10/04/18	10/03/19	5
1.2.3	Produce Meeting Notes for Control	233 days	10/04/18	01/03/19	
1.3	Administration	240 days	01/04/18	01/03/19	
1.3.1	Conducting Administrative Activities	240 days	01/04/18	01/03/19	
2	PROPERTY ANALYSIS	14 days	01/04/18	20/04/18	
2.1	Property Analysis Plan	10 days	01/04/18	14/04/18	
2.1.1	Define Critical Areas for Inspection	2 days	01/04/18	02/04/18	
2.1.2	Develop Analysis Report	7 days	03/04/18	13/04/18	12
2.1.3	Create Schedule for Inspection	1 day	14/04/18	14/04/18	13
2.2	Property Analysis Execution	4 days	15/04/18	20/04/18	
2.2.1	Execute Property Inspection	3 days	15/04/18	17/04/18	14
2.2.2	Analyze Results	0.5 days	20/04/18	20/04/18	16
2.2.3	Define and Rank Areas in need of Development	0.5 days	20/04/18	20/04/18	17
3	ARCHITECTURAL DESIGN	24 days	21/04/18	22/05/18	
3.1	Technical Architecture	4 days	21/04/18	24/04/18	
3.1.1	Identify Physical Capacity	1 day	21/04/18	21/04/18	18
3.1.2	Determine Design Requirements	3 days	22/04/18	24/04/18	21
3.2	Technical Standards	1 day	27/04/18	27/04/18	
3.2.1	Define Technical Standards for IT Room	0.25 days	27/04/18	27/04/18	22
3.2.2	Define Technical Standards for Do-it-Yourself Studio	0.25 days	27/04/18	27/04/18	22

3.2.3	**Define Technical Standards for MyShop**	0.25 days	27/04/18	27/04/18	22
3.2.4	**Define Technical Standards for Common Areas**	0.25 days	27/04/18	27/04/18	22
3.2.5	**Define Technical Standards for Outdoor Areas**	1 day	27/04/18	27/04/18	22
3.3	**Schematic Design**	11 days	28/04/18	12/05/18	
3.3.1	**Design IT Room**	3 days	28/04/18	30/04/18	23
3.3.2	**Design Do-It-Yourself Studio**	3 days	01/05/18	05/05/18	30
3.3.3	**Design MyShop**	3 days	06/05/18	08/05/18	31
3.3.4	**Design Common Areas**	2 days	11/05/18	12/05/18	32
3.3.5	**Design Outdoor Grounds**	3 days	28/04/18	30/04/18	23
3.4	**Design Proposal**	2 days	13/05/18	14/05/18	
3.4.1	**Propose Design to Stakeholders**	0.5 days	13/05/18	13/05/18	29
3.4.2	**Negotiate Changes to Design**	1.5 days	13/05/18	14/05/18	36
3.5	**Design Development**	5 days	15/05/18	21/05/18	
3.5.1	**Develop Approved Design**	5 days	15/05/18	21/05/18	37
3.6	**Final Design Proposal**	0.5 days	22/05/18	22/05/18	
3.6.1	**Propose Final Design to Stakeholders**	0.5 days	22/05/18	22/05/18	39
3.7	**Design Approval**	0.5 days	22/05/18	22/05/18	
3.7.1	**Approve Final Design**	0.5 days	22/05/18	22/05/18	41
4	**PROPERTY DEVELOPMENT**	196 days	25/05/18	22/02/19	
4.1	**Planning**	6 days	25/05/18	01/06/18	
4.1.1	**Define and Rank Renovation Activities based on Property Analysis Results and Developed Floorplan**	3 days	25/05/18	27/05/18	10,43
4.1.2	**Create Timeframe**	3 days	01/06/18	03/06/18	46
4.2	**Execution**	180 days	02/06/18	08/02/19	
4.2.1	**Conduct Internal Renovations**	180 days	16/06/18	22/02/19	47,61
4.2.2	**Conduct External Renovations**	30 days	16/06/18	27/07/18	47,61
5	**PROCUREMENT**	188 days	25/05/18	10/02/19	
5.1	**Planning**	10 days	25/05/18	05/06/18	
5.1.1	**Identify Resources for Property Development**	2 days	28/05/18	29/05/18	46
5.1.2	**Identify Resources for Installation**	2 days	25/05/18	26/05/18	43

5.1.3	**Create Order Timeframe**	2 days	01/06/18	02/06/18	53,54
5.1.4	**Gather Price Quotations**	5 days	01/06/18	05/06/18	53,54
5.2	**Orders**	4 days	08/06/18	11/06/18	
5.2.1	**Choose Suppliers**	2 days	08/06/18	09/06/18	56
5.2.2	**Define and Sign Purchase Orders**	2 days	10/06/18	11/06/18	58
5.3	**Delivery and Inspection**	174 days	12/06/18	10/02/19	
5.3.1	**Receive Deliveries for Property Development**	2 days	12/06/18	15/06/18	59,45,53
5.3.2	**Receive Deliveries for Installation**	2 days	09/02/19	10/02/19	48,59,54
6	**INSTALLATION**	6 days	11/02/19	18/02/19	
6.1	**IT Room**	6 days	11/02/19	18/02/19	
6.1.1	**Install Furniture**	2 days	11/02/19	12/02/19	62
6.1.2	**Install Physical Equipment**	2 days	15/02/19	16/02/19	62,65
6.1.3	**Install Software**	2 days	17/02/19	18/02/19	62,66
6.1.4	**Install Bulk Materials**	1 day	17/02/19	17/02/19	62,66
6.2	**Do -It-Yourself Studio**	5 days	11/02/19	17/02/19	
6.2.1	**Install Furniture**	2 days	11/02/19	12/02/19	62
6.2.2	**Install Physical Equipment**	2 days	15/02/19	16/02/19	62,70
6.2.3	**Install Tools**	1 day	17/02/19	17/02/19	62,71
6.2.4	**Install Bulk Materials**	1 day	17/02/19	17/02/19	62,71
6.3	**MyShop**	5 days	11/02/19	17/02/19	
6.3.1	**Install Furniture**	2 days	11/02/19	12/02/19	62
6.3.2	**Install Physical Equipment**	2 days	15/02/19	16/02/19	62,75
6.3.3	**Install Bulk Materials**	1 day	18/02/19	18/02/19	62,76
6.4	**Common Areas**	5 days	11/02/19	17/02/19	
6.4.1	**Install Furniture**	2 days	11/02/19	12/02/19	62
6.4.2	**Install Bulk Materials**	1 day	17/02/19	17/02/19	62,79
7	**TESTING**	240 days	01/04/18	01/03/19	
7.1	**System Test**	235 days	01/04/18	23/02/19	
7.1.1	**Establish System Test Plans and Procedures**	4 days	01/04/18	06/04/18	
7.1.2	**Conduct System Testing**	3 days	19/02/19	23/02/19	83,63

7.2	**Corrective Actions**	3 days	24/02/19	26/02/19	
7.2.1	**Take Corrective Actions**	1 day	24/02/19	24/02/19	84
7.2.2	**Conduct System Retest**	2 days	25/02/19	26/02/19	86
7.3	**Acceptance Test**	240 days	01/04/18	01/03/19	
7.3.1	**Establish Acceptance Test Plans**	4 days	01/04/18	06/04/18	
7.3.2	**Conduct Acceptance Testing**	1 day	29/02/19	29/02/19	87,89
7.3.3	**Receive Formal Acceptance**	1 day	01/03/19	01/03/19	90

APPENDIX 7 – PROJECT CLOSURE REPORT

Project Name:
Prepared By:

Document Owner(s)	Project/Organization Role

Table of Contents

1. PROJECT CLOSURE REPORT PURPOSE

Project Closure Report Purpose (max 500 words)
Provide a brief description of the project background

2. PROJECT CLOSURE REPORT SUMMARY

a. Project Background Overview

Project Background Overview (max 500 words)
Provide a brief description of the project background

b. Project Highlights and Best Practices

Project Highlights and Best Practices (max 700 words)
Project Highlights Best Practices

3. PROJECT METRICS PERFORMANCE

a. Goals and Objectives Performance

Goals and Objectives Performance (max 500 words)
Provide a comparison of actual project performance to project objectives

b. Success Criteria Performance

Success Criteria Performance (max 500 words)
Provide details of project performance in terms of targeted success criteria

c. Milestone and Deliverables Performance

Milestone and Deliverables Performance (max 300 words)
Provide a description of the actual project performance of project milestones and corresponding deliverables.

d. Schedule Performance

Schedule Performance (max 500 words)
Project Schedule Overview: Project Schedule Control Process: Project Schedule Corrective Actions:

e. Budget Performance

Budget Performance (max 500 words)
Project Budget Overview: Project Budget Corrective Actions:

4. PROJECT CLOSURE TASKS

a. Resource Management

Resource Management (max 500 words)
Shortly describe how were the resources managed

b. Risk Management

Risk Management (max 400 words)
Mitigated Project Risks: Outstanding Project Risks:

c. Communication Management

Communication Management (max 400 words)
Provide an outline the project communication process:

d. Customer Expectation Management

Customer Expectation Management (max 300 words)
Provide a description of how were the expectations of the contracting party (project sponsor) met.

e. Lessons Learned

Lessons Learned (max 600 words)
Shortly describe activities which worked well and which could have been improved.

5. PROJECT CLOSURE REPORT APPROVALS

Prepared By: _____
Position

Approved By: _____
Position

_____
Position

Approval Date: _____/_____/_____

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