

# Web Builders and the Future of the Web Development Industry

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<p>This thesis explores the web development industry and the effect that web development tools known as web builders have had on the web development industry. Web builders offer a cheaper, faster service than provided by traditional web developers. These web builders allow anyone with a computer and internet connection to create their own professional looking, fully functional website without ever having to write even a line of code.</p> <p>This report takes a detailed look at web builders, how effective they are, how they compare to hiring a web developer and if they will ever surpass web developers in terms of sophistication and popularity. Are these web builders just a fad? or do they pose a significant threat to the web development industry and the livelihood of millions of developers around the world? The report answers these questions and takes a look at deeper issues such as automation and the fear of mass unemployment it brings.</p> <p>The study involved a multi-method research approach which involved a first-hand analysis and testing of selected web builders and a gathering of information from experienced web developers using a carefully designed questionnaire.</p> <p>The results of the study highlighted the limitations of web builders and how in effective they are when compared like for like to web developers. The general consensus with regards to web builders in their current form is that they lack the complexity of a professional web developer, the flexibility and the number of customisation options. Though they have garnered a lot of popularity in recent years and have attracted many customers they are still a small fish in a big pond when compared to web developers. In their current form, web builders do not appear to be an imminent threat, but recent breakthroughs in machine learning and the introduction of Wix's Artificial Design Intelligence should serve as a warning. Given enough time and resources, a web builder takeover of web development jobs is not out of the realms of possibility.</p>	
<b>Keywords</b> Web Development, Web Builders, Automation, Threat, Unemployment	

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# 1 Introduction

## 1.1 Background

Web development has come a long way since the very first web site was launched, back in 1991. From a single static page with a few lines of text and a handful of links, web development has transformed into something of an art form and has become an industry in its own right. (CERN 2019.)

Over the years, advancements in the processing capacity of computers coupled with the creation of JavaScript mean that more can be achieved now by skilled web developers than was ever thought possible. The recent introduction of libraries such as jQuery, Bootstrap and React.JS have cut down significantly on the lines of code required to achieve desired results, whilst at the same time making coding more accessible and easier for would be programmers to pick up. (York 2015, 3.)

Since its launch in 1989, the World Wide Web (www) has spread across the globe and is now almost ubiquitous, the number of www users has also grown at an exponential rate. Along with this unexpected growth in web usage, the web development industry has flourished and grown from strength to strength, in order to keep up with the increasing demand of new and increasingly advanced web sites. This blossoming of the web development industry has made it the destination of choice for many ambitious university graduates, and with its promises of high salaries, flexible work environments, and its high employment rate one can easily understand why. However, this industry that many have seen as a job of the future and a safe haven against the threat of increasing automation, may now be under threat. (Gillies & Cailliau 2000, 58-64.)

A technology which is almost as old as the web itself has started to take a hold of the www and may now threaten the livelihood of web developers all over the world. Enter the 'website builder'.

Website builders or web builders as they are commonly known are software platforms which enable users to develop websites without needing prior programming knowledge or the skills of a professional developer. Web builders place the power to create a website in the hands of anyone with a computer and internet access. Within a few hours any layman can design a professional looking, fully functional, dynamic web page. What would have taken weeks for a professional developer or a team of developers can now be achieved

within mere hours. What was once the domain of professional web developers and hobbyists, is now a place for anyone with a computer and internet access. (Shivar 2019.)

In recent years, web developers have gathered a strong following, and a thriving market, as such, many different companies have come to market offering their version of web building software. There are now dozens of web builders available for consumers to choose from, all competing in the same space as web developers, often competing for the same customers. Web builders market their software as an easy to use, cheap solution to create a website. Small companies and individuals can now make their presence known online for a fraction of the cost and after only a few hours of development. The question is, how far will this software develop? And, do these web builders pose a threat to the web development industry? (Shivar 2019.)

In order to answer these questions, I will be studying the topic in depth, speaking to professional web developers and getting their opinion on the matter. I will also be testing some of the most popular web builders around by looking at their features and assessing the sophistication of these web builders as well as identifying any limitations they have. My research will be aimed at answering the following questions:

## **1.2 Research Questions:**

- Do web builders pose a serious threat to the web development industry?

### **Sub Questions**

- How effective are web builders at replicating the work done by web developers?
- What impact have web builders had on the traditional web development industry so far?

## **1.3 Thesis Outline**

In order to obtain answers to these research questions the research will make use of two different sources for answers. Some preliminary research will first be conducted by performing tests on three of the most popular web builders on the market. The tests will be focussed on determining the usability, cost and limitations of the web builders. The goal is to ascertain the threat that web builders pose by comparing them to web developers, identifying the advantages that they offer to hiring a web developer, and determining if they can adequately reproduce the work of a web developer. This will indicate whether a web

builder can presently or will in the future be able to effectively replicate the work of professional web developers. To confirm the results and get a first-hand view from professionals in the industry a questionnaire will be circulated amongst experienced web developers which will gauge their experience with web builders. This questionnaire will gather their opinions on the weaknesses and strengths of web builders and what changes they have seen in the web development industry during their tenure. The questionnaire will be sent to experienced web developers who may have witnessed the introduction of these 'new-age' web builders<sup>1</sup> and may have seen a shift in the industry. The results will then be collected, compiled, and the results discussed before concluding the research and answering the research questions.

## **2 Theoretical framework**

### **2.1 History of the World Wide Web**

In 1989 a British software engineer working as a contractor at CERN (The European Organization for Nuclear Research) devised a revolutionary idea for academics to freely share papers and texts across geographical boundaries. This idea would allow information exchange between computers by using the internet and the newly emerging technology called hypertext. Initially the idea was devised specifically for academics and scientists to share academic documents and files with each other, but this idea would quickly develop into a worldwide network which would come to be known as the world wide web (www). It would change the way we communicate, the way we do business, the way we shop, in short, the www would go on to revolutionise the lives of billions in a way that its creator Tim Berners Lee could not have possibly anticipated. The www was initially proposed in 1989 and would be launched just two years later in early 1991. The very first web page was released later that year and was a very rudimentary attempt at web design by today's standards. It was basically an homage to the www project explaining how the www works, who was involved with the project, and the meaning of hypertext. The page was very plain, there was no hero image, no image carousel, no dropdown menus or mouseovers, it lacked some of the most basic design aesthetics that are taken for granted today (see appendix 1 below). In spite of all this, it was extremely significant, it represented a milestone in technology (Gillies & Cailliau 2000, 58-64.)

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<sup>1</sup> This refers to current, popular website builders such as Wix, Squarespace and Shopify as opposed to their forerunners.

Since the early days of the www web development have come a long way. Web development has become a discipline unto itself. As more and more people have connected to the internet and the www, the quantity of web pages and online content has grown exponentially. The www is now home to over 170 million active websites (Internet Live Stats 2019), and this number continues to grow by the day. Along with this growth we have seen a maturing of the web development industry. There have also been important advancements made in web development. New languages such as JavaScript have been developed, which enable developers to create beautifully, dynamic web pages. On top of this, libraries have been developed to make coding more intuitive, easier to build, and web page loading faster whilst making coding less wordy. As well as these languages and libraries, developer tools such as IDEs (Integrated Developer Environments) help to make the job of a developer more comfortable and easier. All these changes have helped developers to become more efficient and enhanced their ability to produce beautiful, professional looking and original websites. (Jenkins 2019, 23.)

With these changes we have also seen the advent of a new type of software that is built for the average Joe. Software that has opened the field of web development to anyone with a computer and the internet. This software enables any layman to develop web pages without the coding skills or know how. This software is known as a web builder.

## **2.2 Enter the Web Builder**

Website builders or web builders are software tools that enable users to create websites without having to access and edit the code manually. As such, most web builders, especially modern website builders don't require any prior knowledge of coding. They can be used by anyone with a computer and internet connection. Many web builders nowadays offer a very simple drag and drop interface which makes editing very easy for any user as they can see the changes in real time. This feature is often referred to as "what you see is what you get" or WYSIWYG for short. In addition to the website creation and editing web builder companies usually offer their own web hosting for the sites. (O'Brien 2019.)

Despite what many people may think. The idea of web builders is not a new thing. In fact, as early as 1994 the first web builder was created. It was known as GeoCities and was a web hosting platform that offered its users the opportunity to create their very own web pages which were hosted on the GeoCities web site and were divided into different virtual neighbourhoods according to the content and theme of the site. The most impressive thing about GeoCities is that for the first time since the launch of the www anyone who



had internet access had the possibility to create their own web pages. The service offered 15mb of space with each website, and tools including templates that enabled the users to use to build their web pages. The service later updated to drag and drop developer tools to make their service even more accessible and as a result the company gained a huge amount of popularity in a relatively short amount of time. After GeoCities other website builders followed, including dream weaver, Microsoft front page and eventually the likes of Squarespace and Wix and modern website builders. (Geocities 2019.)

Fast forward to the 2010s and a new generation of web site builders started to appear. Advanced drag and drop tools such as Wix, Squarespace, Weebly etc. These new web builders have really started to gain traction largely due to the web becoming more accessible to individuals and small businesses. With the growth of ecommerce and internet shopping as well as social media platforms more individuals and businesses demand an online presence, and this new generation of website builders offers the tools to build your own website, for a fraction of the cost they offer more ease and possibilities than their predecessors. These website builders came at a time when the possibilities of web development are almost limitless, when it really has become an art, this enabled these web site builders to get a real foothold in the market. (O'Brien 2019.)

Web site builders have become a game changer for small businesses and individuals and have disrupted the web development market. Website builders help enable small businesses to remove the competitive edge of larger companies who can afford the monetary cost and time cost needed to develop a website. They enable smaller companies to achieve what they may not have been able to before. In short, this resurgence in web builder popularity has been spurred on a by an ever-growing need for convenience and ease. (O'Brien 2019.)

### **2.3 Automation and IT automation**

Automation can be described as an introduction of technology that enables a task or process to be performed with little to no human involvement (Merriam-webster 2019). The idea of automation is not a new one, in fact the word automate comes from the Greek word *automatos* which means to act of oneself. Centuries, even millennia before the word appeared in literature the idea of automation existed in a very primitive sense. We can look back in history and observe that mankind has always looked for ways to improve tasks, whether it be to make the performance of the task more efficient, to make the task easier or to speed up the task. Some of the earliest examples of automation include tools

such as levers, pulleys and wheels, all helped to make tasks more efficient and less time consuming. (Frey 2019, 37-42.)

Mankind has always sought to improve his situation, and these improvements have been achieved through invention. Many of these inventions fall under the category of automation. Often automation is driven by manufacturing and fuelled by businesses needs. Businesses want to cut costs, improve quality and scale up their production. The industrial revolution saw the invention and implementation of a huge number of pioneering automative solutions in the manufacturing industry. Solutions which were game changers. Notable examples include the lathe, the fourdrinier, and the power loom. (Product Handling Automation 2016; Frey 2019, 37-42.)

Indeed, automation has benefitted mankind in many ways but there is always a trade-off between increasing automation and unemployment. Indeed, the very purpose of automation is to reduce human involvement in processes and tasks. One merely has to look back in history to see that the result of automation is at best job losses and at worst a complete decimation of a job or even an industry. If we look back to the industrial revolution we can see examples of this. One notable example is the introduction of power looms in the textile industry. These new power looms were built in such a way that a single worker could operate as many as 16 looms at any one time, thus making many textile workers jobs redundant. The resulting unemployment caused by power looms triggered the luddite movement. A more modern example is that of telephone switchboard operators, this work was once performed manually by the operators who had to physically connect wires to the right circuit on a switchboard to enable a connection. This process was changed so that it is all done digitally with no need to manually switch lines. The result was that the job can be done with more accuracy and more speed than ever before thus reducing the reliance on workers and in turn causing job losses. (Selby Soft Furnishings 2018.)

We are always seeking ways to improve processes in every aspect of life. Even in this information age, when much of our work is accomplished or recorded digitally using computers and software platforms we continue to search for ways to improve processes. This is where IT automation comes in. IT automation is a form of automation which focusses on automating processes that would otherwise be carried out by an IT professional. These processes are automated using a variety of tools but fundamentally the goal is to create a framework of instructions which can be followed by computers and help to limit the need for human input. This framework should ensure a repeatable, uniform process. IT automation may involve the use of artificial intelligence, as is the case with RPA (Robotic Process Automation). There are many applications for IT automation

such as payroll automation or self-service automation. Indeed, web development using website builders can be considered an example of IT automation as they seek to remove or limit human involvement and reduce the number of required steps in the process of web development. Wix's own patented system is very much an example of the use of AI and an example of IT automation. (King 2018, 8.)

With all these innovations and new automative solutions afforded by the advancements in robotics, AI and other tech, fears have arisen that the future will bring with it mass unemployment the likes of which has never been seen before. Despite this increasing threat posed by advancing technology some jobs seem exempt from this mass automation and mass employment crisis, most of which fall under the domain of tech and IT. Many consider this area a haven from the looming unemployment crisis given the difficulty of job replication and the level of skill and education required to perform these jobs. The web development field is one such field that was considered immune to the threat of increased automation. (Hawksworth, Berriman & Goel 2018, 4, 24.)

With the increasing push for IT automation and recent advancements in web builders even this once safe-haven could be under threat. The questions one must ask are: will this trend continue and how far exactly will it go? And as web builders become more advanced will they continue to gain popularity?

## **2.4 The Reasons for Choosing this Topic**

I myself have held a vested interest in this topic for some time now. I spent much of my time at Haaga-Helia learning about web development and completing web development assignments. Whilst learning to code and create websites I couldn't help but wonder if my time at Haaga-Helia may be a wasted. Would I end up jobless with a useless skill at the end of the two years. Or perhaps find my skills and knowledge obsolete later in my career. Well, that remains to be seen. The best I can do now is research the topic myself. So I conducted a bit of rudimentary research prior to this thesis but was disappointed to find that only a few developers felt the same. The topic has been discussed before and one does not have to search very far to find forum discussions and message boards which cover the topic. What all these discussions and debates are lacking is a complete and conclusive answer. Most of the answers are based on anecdotal, unscientific evidence. No scientific studies exist on the matter and many web developers merely dismiss the idea as nonsense and nothing to worry about. I wanted to cut through the bias, cut through the uncertainty and research the topic finding an answer for myself and for others

who are considering a career in web development or who are already employed in the industry. The web development industry employs millions of people per year and I wanted to determine whether these jobs are at risk and if so, how many of them would be at risk.

### **3 Method**

#### **3.1 A Multi-Method Approach**

In order to provide accurate and complete answers to the research questions the research was divided into two parts and two different sources were used for the research. Adopting a multi-method approach can limit certain biases that may arise with a single method approach. As well as removing these biases there are a few added benefits of using a multi-method approach as oppose to a single method approach:

- The results are triangulated which makes them more concrete and more reliable
- The consolidation of different sets of data ensures a deeper understanding of the test phenomenon
- The methods compliment each other by providing checks to one another
- The results from the first method can to guide the second methodology by giving a clearer outline of the research topic

These reasons all helped to persuade me to choose a multi-method approach. I wanted stronger results that would be more resilient and would stand up to the scrutiny of external observers. I feel that the questions warrant a more in depth study, and I wanted to ensure that I was asking the right questions to the developers. (Emeraldgrouppublishing.com, 2019; Walliman, 2017, 167-169.)

#### **Research Method 1**

The first part of the research involved approaching the questions from a first-hand point of view by performing tests and gathering information on leading web builders in the market. The test subjects were chosen according to their popularity. Wix, Squarespace, and Shopify appeared to be some of the most popular web builders each with an impressive number of active websites. After a bit of research, the most suitable metric for assessing the web sites popularity appeared to be the ‘number of active websites’. At first the number of users seemed to be the obvious choice; however it was much more difficult to find complete information on the number of registered users per web builder. The other problem was that people may register an account or multiple accounts without ever creating a website, so it doesn’t give an accurate reflect the popularity of the web builders or give a

current reflection of popularity. After determining which web builders to test the tests were performed on the web builders and research carried out to obtain data on the designated web builders. The data was then used to evaluate the web builders by comparing them to corresponding data about web developers.

The testing involved performing typical web development tasks such as creating basic webpage features and styling to highlight how user friendly the software was and reveal limitations in the software. In collecting this data, the goal was to ascertain the complexity and sophistication of the software, its ability to perform the tasks that are typically performed by a developer and the usability of the product. The usability of the web builders was tested by performing heuristics analysis on each of the three web builders. The Molich and Nielsen euristics were used to analyse the user interface of the web builders. Rather than perform a full analysis with all ten of Molich and Nielsen's heuristics only three were chosen. Three that would ascertain a clear rounded view of the usability of the web builders. The reason only three heuristics were used was because of constraints such as time constraints and to avoid placing too much emphasis on usability over the other testing criteria. Other data collected included the costs associated with web builders and the approximate speed of development using each of these web builders. Some of this data was not obtained through the means of testing, such as the costs of using a web builder, or the number of live websites per web builder. This information was gathered from published materials online, e.g. company accounts and information from the web builders' own websites. All this data served to paint an initial picture of the popularity, the usability, and the comparative costs of development when compared with like for like with data about web developers. (Nielsen & Molich 2005.)

**The criteria used to assess the web builders:**

- Speed of development
- Usability (Heuristics Analysis)
- Popularity (Active websites)
- Cost of development

**Research Method 2**

The second part of the research took the form of a questionnaire. This questionnaire was designed for professional web developers. All the participants were either former web developers or were employed in the web development field at the time of the study. The rea-

son for selecting this sampling group was to obtain a qualified insight into the web development industry as it is now as well as its future outlook. To increase the validity of the results the idea was to select participants from different locations. Given the time constraints and the scope of the study a goal of 20 participants seemed appropriate for the study.

The questionnaire touched on some of the same points as the first research method, with some additional questions and some that seemed more appropriate to ask to professional developers. The goal was to obtain a consensus on what developers think about web builders in general, their professional opinions on the limitations of web builders, if they are effective tools for web development and whether they pose a significant threat to web developers and their industry. The questionnaire used for the research is contained in the appendices below (see appendix 2, below).

### **3.2 Increasing the validity of the results**

The sampling group that was used for the questionnaire comprised exclusively of web developers. Selecting only professional web developers ensured that the participants had a greater insight into the topic and the web development industry, however as the group all share the same profession, there was a risk that the participants would show bias in their questionnaire responses. This bias might slip in for reasons of self-preservation, being overly optimistic about the future prospects of their industry or being overly defensive of their industry. To eliminate any creeping bias from the participants, some measures were taken. The research was divided into two parts. This provided insights from two groups and data from two different approaches which in turn helped reduce any bias that came from a single group. By questioning others, this gave them the power to confirm or repudiate my own beliefs on the research topic and thus remove or limit any chance or confirmation bias slipping into the results.

The first research method was carried out by myself and was approached with an outsider's perspective, i.e. from that of a layperson who has limited experience of the web development industry. My relative inexperience placed me in a good position to answer from this viewpoint. Also, most of the first research part was based on objective data. This provided a nice contrast to the second part of the research which involved only web development professionals and relied purely on opinions or subjective data.

The first part of the research produced mostly quantitative data which complimented the data from the second part of the study which involved a mixture of both qualitative and quantitative data. Having quantitative data as well as qualitative data may have ensured

more reliable research outcomes and may have helped to further remove any bias that would have otherwise arisen from the sampling group.

The first research method was based on three web builders, this provided more validity to the results than if only one were used. Using one web builder can give a skewed and unrealistic view of web builders. There are now lots of web builders on the market and time would not permit a full and complete assessment of every one of these web builders. So, three seemed like a suitable compromise.

Varying the sampling group was important. Web developers from Helsinki as well many other locations were contacted using platforms such as reddit, and social media platforms. This helped increase the reliability by removing any cultural bias and would show if the answers held true for people living in other parts of the world where the economy and the web development industry may be different, i.e. if they could be generalised. The participants also represented a variety of experience levels, this was not intended but rather a happy coincidence.

### **3.3 How the Research Methods Help Answer the Research Questions**

#### **Research Method 1**

The first research method delivered a prefatory view of the reliability and effectiveness of some of the most popular web builders on the market as well as determining their popularity. The rationale for choosing some of the most popular web builders was that one would expect the most popular web builders to be among the most effective at replicating the work of a developer, generally more people will choose the product that offers the best quality within their price range. The chosen web builders yielded data which can be generalised across the market. Testing the web builders gave an indication of the current level of sophistication of all web builders. This helped answer the question of whether web builders pose a serious threat to the web development industry, and how they compare to web developers. The data also gave an accurate indication of the future outlook of web builders and how far they need to advance to be able to perfectly replicate or surpass web developers.

The data that was collected on the three web builders included the number of active websites developed with each web builder, this statistic gives an indication of the effect that web builders have already had on the web development industry. They were also tested for usability and how intuitive the interface of the web builders was. The products' target

audiences are generally non-technical persons so presumably if they can provide an easy to use product this will ensure its popularity. This may also be an influencing factor in a business or individual's decision to choose this route as opposed to hiring a web developer, thus increasing the threat posed to the web development industry. The statistics on the number of active websites also helps to answer the question of what impact web builders have had thus far on the web development industry.

The first method included estimating the speed of developing a basic website using each of the web builder. Development speed is another draw for customers, a faster product can attract more users, thus denying web developers custom. Perhaps the most significant factor in influencing users is the price level. This is one thing that was expected to have a significant impact on the users. Web builders are accessible to anyone, even non-technical individuals, as such one would expect the web builder to be much cheaper to use as web developers can command a higher price for their service offered. Price is one of the main marketing points, so one would expect much cheaper prices for web builders. Price points also help answer the question of the seriousness of threat posed by web builders, web builders market themselves as a cheaper alternative, so if they really do offer a much cheaper price, they have the potential to attract many more users and pose a real threat to web developers.

## **Research Method 2**

The second part of the research contained questions which asked the developers about their opinions on web builders, their effectiveness, and the future outlook for the web development industry. The goal was to answer the main question on the threat posed by web builders. Web developers are well placed to be able to answer that question. They know their industry, they may be able to see changes in business over the years, any drops or declines in business, especially the more seasoned developers, who have seen changes over the years. I expected some of the developers to have some experience with web builders as well, which would help them to answer this question, as they would know what they are up against, so to speak. They would know the competition and what it can offer as well as what it lacks.

One intention of the questionnaire was to answer the question of what effect web builders have already had on the industry to this point. The more experienced web developers were perhaps better placed to give an accurate view of changes in the industry over the years. In order to answer this question some questions were devised and added to the questionnaire that focussed on answering this question. The participants were asked if



they had seen changes in their industry and to rule out any other variables, they were asked whether they believed these changes to be caused by web builders. Data was also collected on the number of live websites that had been created by each of the web builders which were compared with the websites built using code.

### **3.4 Working Conditions and Considerations**

Whilst conducting the research I had to consider my own views on the topic and my own insecurities, thoughts and biases. I have some skin in the game, so to speak so I had to remain as impartial as possible to make the research as reliable and unbiased as possible.

Given constraints such as timeframe it was vital to ensure that the sampling size was appropriate, not making it too big to collect and analyse the results whilst also making sure to take full advantage of the available time and obtaining the largest sample size possible for the given time frame.

Ensuring that the selected assessment criteria and metrics were suitable for testing the web builders with was integral to the validity of the study. It was important to make sure that the chosen criteria would give an accurate depiction of web builders as a whole. Given more time, the scope of the study could have been expanded and more criteria could have been selected but due to time constraints only the most suitable could be chosen.

One characteristic of any reliable study is that it should yield repeatable results. Using larger sample sizes and varying the sampling group would increase the repeatability of the results. For this study this would involve testing more web builders, using a larger number of participants for the questionnaire and varying the participant group in terms of location, experience etc. Given the time constraints only 3 web builders could be chosen for the study and 20 participants for the questionnaire. This meant carefully selecting 3 web builders that adequately represent web builders and the market as a whole. Hence why 3 of the most popular were chosen. Their popularity would suggest that they are among the most sophisticated and effective at creating web sites. To make the questionnaire responses more valid and repeatable participants were chosen from a variety of different locales, this made the results repeatable across cultures and nations.

### **3.5 How certain answers will help draw conclusions**

With the preliminary research, any indication that the web builders provide a reliable, effective substitute for traditional web builders would suggest that they pose a very real threat to the web development industry. Prior to the tests, the expectation for the web builders was a quicker development time and a much lower price level, as these are two selling points of web builders. Even with lower prices and fast development times a web builder still needs to offer a quality, feature rich product. If the features are there and there are plenty of customisation options this adds to the threat.

The number of active websites per web builder gave a good indication of the number of times a web builder was chosen over a web developer; this helps answer the question on the impact that web builders have already had on the web development industry. Presumably many of these active web sites would have been developed by web developers without the existence of a cheap and reliable substitute as provided by web builders. It is important, however to note that the existence of a cheap affordable alternative may also have encouraged some business owners and individuals to create a website that they otherwise would not have. So, the existence of a cheaper alternative may have encouraged more customers to come into the market, thus increasing the size of the market.

Had the majority of questionnaire respondents indicated that web builders are a reliable substitute and that they can perform the same tasks at a similar level this would suggest that they do pose a threat to web developers. If most of the web developers answered that they believed that web builders will replace all web developer jobs this would help answer the main research question in the affirmative. If the participants had claimed to have seen a loss in business this would answer the last question about what impact web builders have already had.

### **3.6 Limitations of the Approach**

The first segment of the research involved testing out only three web builders. There are many more web builders on the market right now. One could argue that only testing the three most popular web builders doesn't give an accurate depiction of all web builders or the whole market. One thing that may have helped increase the validity of the results and helped reduce bias would be interviewing the users, those who have used web builders extensively or those who have paid web developers for their services, this would give a clearer insight into what helped them make their decision.

## 4 Results

### 4.1 Research Method 1

Metric	Wix	Squarespace	Shopify	Web Developer
Approximate Speed of Development	2 hours. Minutes using Wix's ADI system.	2 hours.	2 hours for basic website, can take much longer to list sale items	Weeks
Active websites	3,373,287  (Built With 2019a.)	1,886,104  (Built With 2019b.)	981,768  (Built With 2019c.)	170-200 million  (Internet Live Stats 2019.)
Cost of Development	4-30 euros per month (incl. hosting and domain)  (Wix 2019a.)	11-42 euros per month (incl. hosting and domain)  (Squarespace 2019.)	29 (+ 2% transaction fee) – 299 (+0.5% transaction fee)  (Shopify 2019.)	2,000-10,000
Usability (Heuristics)	<p>Templates and Wix's ADI system ensure minimal steps in the process.</p> <p>Undoing erroneous actions is very easy</p> <p>Wix offers a clean relatively clutter free aesthetic.</p>	<p>Squarespace relies on templates which cuts down on steps.</p> <p>Undoing/redoing actions can be more difficult.</p> <p>The aesthetic is clean, but a bit confusing.</p>	<p>The steps are few, but are not so intuitive.</p> <p>Undoing actions is a problem at times.</p> <p>The aesthetic is clean but slightly less intuitive.</p>	-

Table 1. Results from Research Method 1

The results from the first research method signify that the web builders offer a much faster solution to a web developer, as well as much lower costs. These results were not unexpected but are nonetheless illuminating. The number of active websites was perhaps the most shocking result in this group. The data shows that active websites number in the hundreds of thousands or millions across the three test web builders, but their combined figure is still significantly smaller than the total number of active websites. The results reveal limitations of the web builders. The data obtained from the research method 1 will be discussed further in chapter 5 'Discussion – Method 1 Results'.

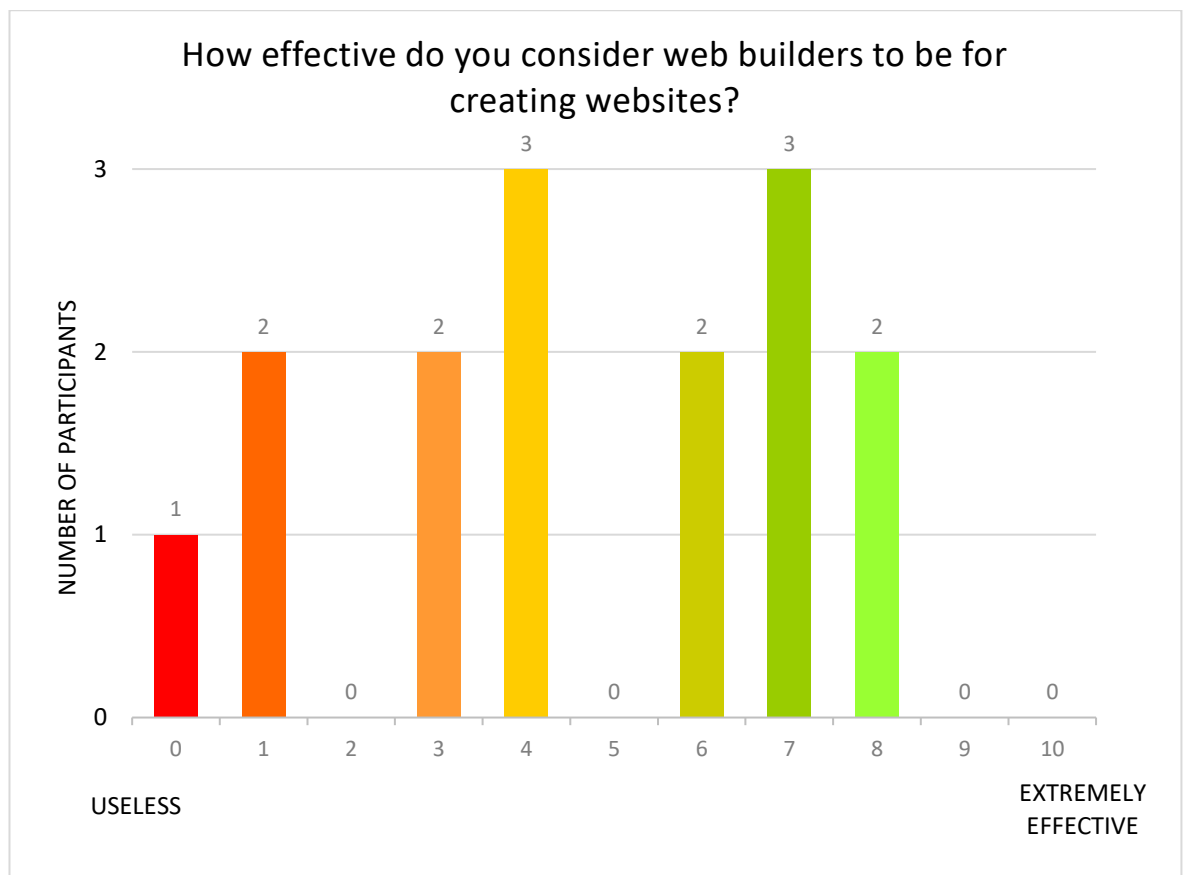
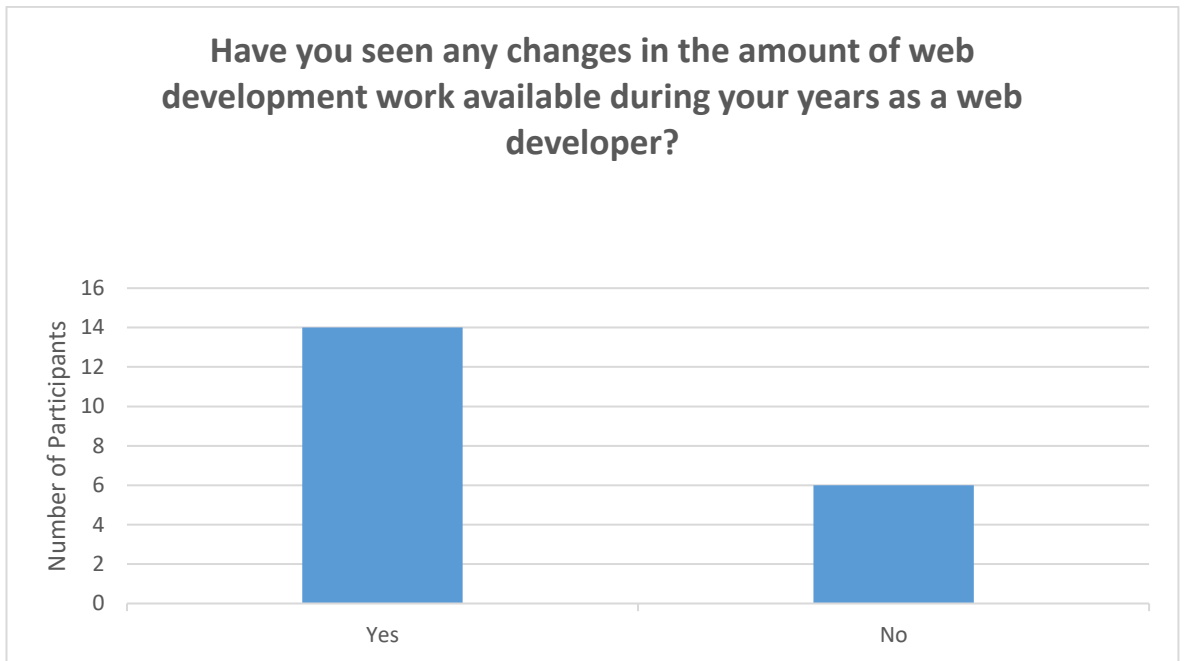
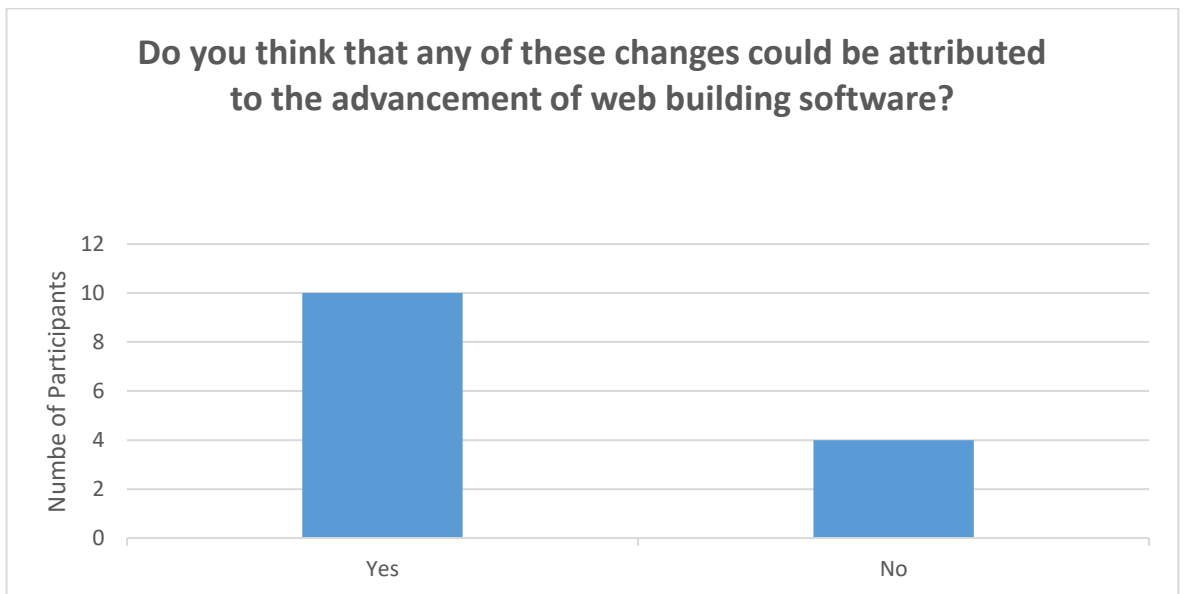


Chart 1. How web developers rate web builders

The graph shows that most of the results lie above 4. Only one respondent rated the effectiveness of web builders as 0 or useless and none were completely satisfied with web builders as a reliably effective tool for web development as evidenced by the graph no respondents gave the rating of 9 or 10.

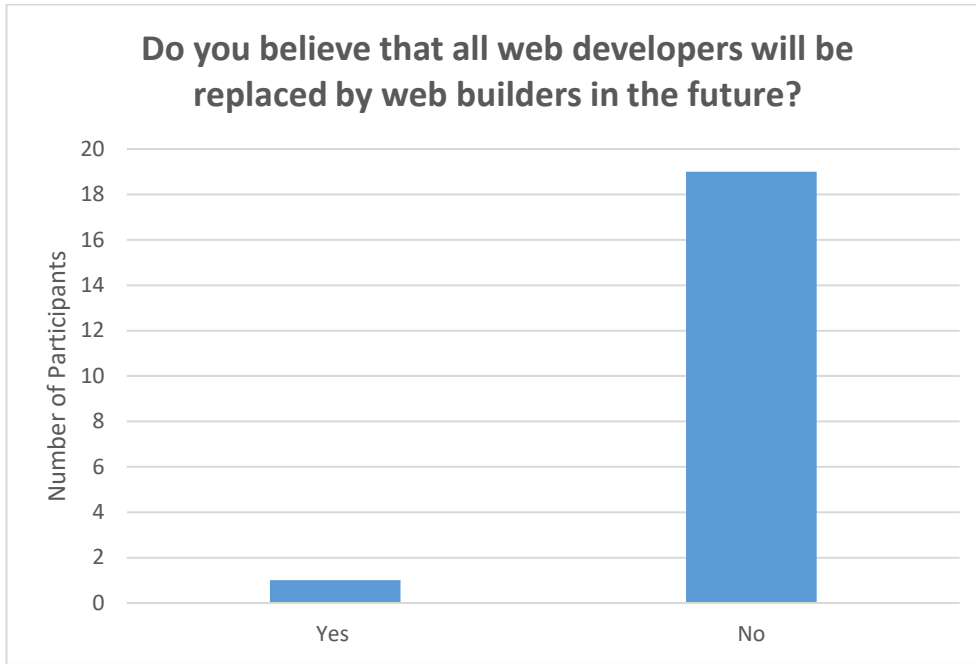


*Chart 2. Questionnaire Results - Have you seen any changes in the amount of web development work available during your years as a web developer?*



*Chart 3. Questionnaire Results - Do you think that any of these changes could be attributed to the advancement of web building software?*

Bar charts 2 & 3 should be analyzed together. Together they reveal an interesting belief of the respondents. Most of the participants who claim to have noticed a difference in the amount of web development work available over the years, believe that web builders have contributed to this change.



*Chart 4. Questionnaire Results - Do you believe that all web developers will be replaced by web builders in the future?*

The results suggest that most of the participants feel assured of the future of their industry. Most feel secure in their positions, and do not consider web builders to be a significant threat to their industry. This is perhaps the most significant result and goes furthest towards answering the main research question. Only 1 respondent out of 20 believed that web builders have the potential to replace web developers in the future. In other words, only 5% of the respondents believed this to be a possible future outcome.

## **5 Discussion – Method 1 Results**

### **5.1 Speed of development:**

The results shown in table 1 illustrate that the time saving of using a web builder over a web developer is significant. What would normally take weeks for even the most skilled developer can be accomplished within hours by any non-technical person using any of the three web builders. With Wix’s patented Artificial Design Intelligence (ADI) system this process can be expedited even further to mere minutes. The development speed is a big selling point for web builders and can be particularly appealing for a small business or a busy individual. This result was not unexpected, web builders require little to no technical skill and are marketed as a faster solution than hiring a web developer. Wix’s ADI tool was

particularly impressive, something that exceeded expectations. The tool accepts user requirements and creates a handful of bespoke options based on the requirements from which the user can select their favourite. Though the process involves less human input, the tech does offer a solution that efficiently meets the users' requirements.

One could argue that there is a trade-off between reducing human involvement and less tailored websites, but what they could not argue with is that this new tech produces a professional looking solution within a fraction of the time taken by a web developer.

This is an example of true automation. With many technological changes industry workers are forced to adapt, web developers can learn new skills to make themselves more marketable, or even market themselves as web designers using web builder tools to create websites. Some people have successfully marketed themselves as web designers using web builders as their tools one can observe this by searching for web designers on [fiverr.com](https://www.fiverr.com), the social web platform that enables users to buy and sell their services. One could also hire a web designer who uses web builders from Wix's own Wix Arena (Wix 2019b). However, ADI is a tech that is perhaps the greatest threat to web developers, as it removes all human input other than that of the customer. Perhaps ADI is a one off or maybe it is here to stay. Given the growing trend of machine learning one could surmise that it is here to stay. And as it develops and becomes more advanced it might prove to be a worthy adversary to web developers and may be able to overcome any concerns about meeting users' needs that web builders have.

## 5.2 Active Web Sites

The data obtained of active website numbers as displayed in table 1 was unexpected. Given the relative ease of using a web builder and the low prices offered by web builders, one would expect customers to be flocking to web builders, however the statistics paint a different story. On their own the numbers appear to be quite impressive when you consider that Wix alone has over 3,3 million current active websites on its portfolio. However, when comparing these numbers to the total number of websites and considering that these web builders are three of the most popular in terms of active web sites it is quite shocking, and it really puts things into perspective. The web builder market is dwarfed by the web developer market. The statistics show that there are currently around 150 to 200 million total active web sites on the www (Internet Live Stats 2019) and we can deduce that all active websites that are not built with a web builder are created by web developers. Even after adding together the stats for all three web builders we get  $(3.373.287 + 1.886.104 + 981.768 = 6.241.159)$  6.241.159 active websites. If we compare this to the

150-200 million active websites, we can see that they make up a small fraction of the total active websites currently.

Even though there are dozens of other web builders around it is unlikely that their cumulative number of active websites is significant. One could argue that this number just represents the beginning for web builders and their numbers will continue to grow, but if we consider that Squarespace has been around for 15 years and we look at the historical stats for Squarespace we can actually see that Squarespace currently sits at 1,8 million live sites yet historically has had 3,6 million websites during its lifetime, that means an astounding 1,8 million are inactive (Squarespace 2019). This suggests that web builders such as Squarespace are not just starting to gain popularity but have been established for some time. That may even suggest that there has been a drop-off of activity and popularity. One could argue that this may be Squarespace only as people may have opted to use other web builders, but looking at the stats for Shopify are even more condemning with Shopify currently sitting at 981.768 live websites with a historical figure of 2.479.703 web sites or less than 40% of historical websites currently active (Shopify 2019).

Let us also consider the fact that Wix has over 150 million registered users (Wix 2019c). This means the company is not a fledgling company, but quite established. The question is why is the number not bigger, will it grow larger in the future? Something must still make people and businesses opt for developers over web builders. We know that these three web builders beat web developers on price and speed of development so if it's not the speed or cost one could deduce that web developers offer more quality, effectiveness and features.

### **5.3 Cost of Development**

One strong selling point for web builders is the relatively low cost of using a web builder over a web developer. Wix was particularly impressive with a payment plan for as little as 4 euros per month<sup>2</sup>. That price even does not include the cost of the domain; this would be an additional cost. Shopify's costs can add up a bit especially for the most expensive plan, but this includes 15 staff accounts so it is for larger ecommerce businesses (Shopify 2019). If we consider that the typical cost of a web developer is anything from 2,000 euros

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<sup>2</sup> Wix offers to publish sites for free, but this is under the Wix domain. For the sake of argument, we can rule out this option. No business would use Wix's domain, but rather their own domain, very few people would want to use a web builder's domain to run their site on nowadays. The 4€ option is the cheapest option for running the site on your own domain.



to 10,000 it is shocking in comparison and the choice seems an obvious one for a small business or individual. But considering that most web builders offer an ongoing monthly cost as oppose to an initial lump sum like web developers the costs can add up and may even converge in the long run. Perhaps web builders are suffering from the IKEA effect. They seem great value and quality for money even though the user is paying for something that they themselves are creating. Or to put it into the words of the researchers who identified this phenomenon "labor alone can be sufficient to induce greater liking for the fruits of one's labor: even constructing a standardized bureau, an arduous, solitary task, can lead people to overvalue their (often poorly constructed) creations." (Norton, Mochon & Ariely 2011, 4.)

#### **5.4 Heuristics Analysis**

Using three of Molich and Nielsen's user interface design heuristics as designated above, one can determine that the web building platforms all offer a similar level of usability. The differences between the web builders in terms of the three heuristics are small. Wix is the easier platform to use, providing a clean and minimalist working environment and removing steps from the development process by relying on templates and of course Wix's ADI system which can create a selection of websites after just a few clicks. SquareSpace didn't perform quite as well as Wix according to the heuristics but the difference was marginal except for with the efficiency of use. For Flexibility and efficiency of use Wix's ADI system outperformed anything SquareSpace had to offer and the difference was quite significant. Shopify on the other hand appeared to be the most confusing, though it provided a clean clear display, undoing actions was far more difficult and though the steps required were few, the process was much more confusing. The differences overall were not too large, but comparing these to the ease of hiring a professional is quite revealing. Hiring a web developer requires little to no interaction with any tool or platform. The web developer will guide the customer through the whole process, explaining in layman's terms everything from the requirements to the design and implementation. The developer is always the easier option. However Wix's ADI tool is a game changer and the added value of cheaper rates adds to the appeal. (Nielsen & Molich 2005.)

## **6 Discussion – Method 2 Results**

### **6.1 Web Builder Ratings**

As depicted in the chart 1. Most of the respondents believed that web builders are in some way useful, with only one answering that they believed the website builder to be useless, however according to the results some of the web developers had never heard of website builders and only half of the participants had used a website builder before, so it's very possible that this respondent has never used a website builder before or even heard of them. Most of the respondents believe the website builders to have an effective rating of 4 or more with 10 of the 15 respondents rating website builders as 4 or higher on the effectiveness scale or 2/3 which is significant. The mean of the results in this case was also 4.6. Unfortunately 5 participants did not answer, as already mentioned some of these developers have no experience with web developers and some have never heard of them before this could explain the missing responses. The results would suggest that most of the website developers consider web builders effective and useful in some way. Though it seems that all respondents believe there is something lacking, given the fact that no one rated website builders as a 10 or a 9 and extremely effective. This fact is also played out in the rest of the answers to the other questions. We can see from the list of limitations most respondents believe that the web developers have limitations. Which would suggest that the developers consider web builders as inferior in most or all cases. They are lacking something that a web developer can provide.

### **6.2 Changes in Web Development Industry**

Most of the results showed that the developers had seen a shift in the amount of the available work during their tenure. The problem with this question is that it is not specific enough and this change may either reflect an increase in available work or a decrease in available work. Web builders may have even drawn more customers to the market encouraging more people to develop a website and as one of the respondents suggested, it might be an entry point for some customers into creating a website, that otherwise wouldn't exist. Assuming that the results represent a decline in available work, most of the web developers believed that this change was at least partly due to web builders. This is reflected in the results depicted in chart 3. It is revealing that web developers who work in the industry have claimed to have seen a change in the amount of work within their field. Most of whom attributed this change to web builders. This helps answer the question about what effect web builders have had on the web development industry thus far, and therefore their threat to web developers.

### **6.3 Limitations**

The limitations suggested by the web developers were very interesting. There was almost a complete consensus that web builders are limited and provide limited customization options. In fact, 9 out of 12 or an astounding 75% of respondents mentioned something about web builders being limited compared to a web developer. The issue of limited customization options can be overcome with time and one would expect web builders to offer more expansive options as time goes on to keep up with web development, however this depends on the audience they cater for. The primary audience of web builders is generally small businesses and individuals who don't require a very advanced or unique website, but are attracted by the cost and time savings offered by web builders. One respondent suggested that the software is "still very simplistic and not very advanced" another was concerned about the ownership of the website This is a legitimate concern as the web builders are for the most part integrated web hosting platforms as well. In some cases, one can use external hosting for their website, but once you stop paying the fee you cannot use your web site. The complete list of limitations is shown below in appendix 3.

### **6.4 The Future of the Web Development Industry**

Chart 4 depicts perhaps the most significant results. The results are very revealing and helpful in answering the main research question. Only 1 respondent out of 20 believed that web builders have the potential to completely replace web developers in the future. In other words, 5% of the respondents believed this to be a possible outcome. These results could be explained by a number of reasons including bias from the participants or being defensive of their industry. It is important to note that 10 of the respondents or only half have used a web builder so only half of the developers know what web builders can do. However, even if we account for this and discount 10 of the participants as participants without experience of web builders, we still can say that only 1 out of these 10 believes that web builders could replace web developers in the future, still only 10 per cent. One could assume that this 1 participant has experience with a website builder otherwise it's unlikely he/she would have any concerns. Instead of assuming, let's suppose this respondent has no experience that makes the result even more telling, as it would mean that all developers with website builder experience and thus qualified to answer the question believe that website builders do not pose a significant threat to web developers. This does not however mean that they do not pose any threat, as we can see some people be-

lieve that the workload has been affected by web builders. It just means that the participants believe there will always be jobs for developers and that a complete takeover by web builders is unlikely.

## **7 Conclusion**

### **7.1 How effective are web builders at replicating the work done by web developers?**

According to the developers, web builders appear to be somewhat effective at replicating the work of web developers. They received a fairly mediocre average rating of 4,6 out of 10. After testing three of the most popular web builders myself, I would disagree somewhat and award them a slightly higher rating. The web builders seem to be very effective at providing all the tools necessary to create a unique, professional looking, responsive website. However, given my relative inexperience I can concede that perhaps the web builders are somewhat lacking in comparison to web developers. My first research method did reveal some of the same limitations as those suggested by the web developer questionnaire group, the real issue is that web builders in their current form, don't lend themselves so well to creating completely unique websites, they rely on templates and a limited number of customization options.

### **7.2 What impact have web builders had on the traditional web development industry so far?**

Surprisingly, web builders have had a very minimal impact on the web development industry thus far when one considers the numbers. They are not the market disrupters that people may have considered them to be. Perhaps we will see a growth in their popularity in the near future, but this is unlikely unless we see the software developers improve these web builders and overcome the current limitations. The number of active websites created with these three web builders still only represents a small fraction of the whole web development market.

### **7.3 Do web builders pose a serious threat to the web development industry?**

Overall the results were extremely illuminating and give interesting answers to the research questions. The data from the first research part would seem to position web builders as the obvious choice for developing a website. They offer much faster development

speeds combined with much lower initial costs. This would make them appear to be the number one choice for businesses and individuals, but they have not quite hit the mark and still trail behind web developers. They provide a great entry point for small businesses and individuals who want a quick and cheap alternative to hiring a web developer. It's always easier to outsource the work to a developer, however the three web builders do offer a comfortable and intuitive platform. Some of the features may take a bit of getting used to in some cases, but in spite of this the interface should provide a comfortable and easy developing experience for even the most technically inept individual.

Perhaps the issue of limited customisation options will be tackled in the near future, but there is less of an incentive to make these changes given that the target audience of web builders may be more concerned with price and speed of development. The questionnaire results showed that web developers seem assured of their position, it is unlikely that web builders will pose any significant threat now or in the future. Web developers consider web builders as inferior and, in most cases, believe that web builders will never pose a serious threat to their industry. The results suggest that web builders will never fully replace web developer jobs. The jobs of web developers are safe. I personally believe that web builders are here to stay, and with the growth in automation and machine learning they will only become more advanced as time wears on. Although it appears unlikely, it is not out of the realms of reality that they could replace web developers in the distant future. If one considers Wix's ADI system and what it is capable of currently although the technology is still in its infancy, it really does make one wonder what the future of this technology will bring. In any case, it is clear that web developers are not under any imminent threat from web builders. There are still many improvements to be made. The web development industry may very well be the safe haven from increasing automation that it has been lauded as, time will tell.

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# Appendices

## Appendix 1. The First Ever Web Page (info.cern.ch)

### World Wide Web

The WorldWideWeb (W3) is a wide-area [hypermedia](#) information retrieval initiative aiming to give universal access to a large universe of documents.

Everything there is online about W3 is linked directly or indirectly to this document, including an [executive summary](#) of the project, [Mailing lists](#) , [Policy](#) , November's [W3 news](#) , [Frequently Asked Questions](#) .

[What's out there?](#)

Pointers to the world's online information, [subjects](#) , [W3 servers](#) , etc.

[Help](#)

on the browser you are using

[Software Products](#)

A list of W3 project components and their current state. (e.g. [Line Mode](#) ,X11 [Viola](#) , [NeXTStep](#) , [Servers](#) , [Tools](#) , [Mail robot](#) , [Library](#) )

[Technical](#)

Details of protocols, formats, program internals etc

[Bibliography](#)

Paper documentation on W3 and references.

[People](#)

A list of some people involved in the project.

[History](#)

A summary of the history of the project.

[How can I help ?](#)

If you would like to support the web..

[Getting code](#)

Getting the code by [anonymous FTP](#) , etc.

## Appendix 2. Questionnaire

- How long have you been working as a web developer?
- Are you familiar with web builders e.g. Wix, Ionos, WordPress?
- 
- Have you ever used a web builder before?
- 
- If so, how effective do you consider web builders for creating websites?  
(not effective), (effective), (very effective)
- What are the limitations of web builders?
- Have you seen any changes in the amount of web development work available during your years as a web developer?
- Do you think that any of these changes could be attributed to the advancement of web building software?
- Do you believe that web builders can now, or in the future reliably replicate the work done by web developers?
- Do you believe that web developers will be replaced by web builders in the future?
- What do you think is the appeal of using a web builder?

### Appendix 3. Questionnaire Results

#### Approximately how long have you been working as a web developer (years)?

Number of Responses: 19

Years	Number of Participants
0-3	5
4-7	9
8-10	3
11-12	2

#### Are you familiar with web builders e.g. Wix, Ionos, WordPress?

Number of Responses: 20

Choices	Number of Participants
Yes	17
No	3

#### Have you ever used a web builder before?

Number of Responses: 20

Choices	Number of Participants
Yes	10
No	10

#### If so, how effective do you consider web builders for creating websites?

Number of Responses: 15

Effectiveness (on a scale of 0-10)	Number of Participants
0	1
1	2
2	0
3	2
4	3
5	0
6	2

7	3
8	2
9	0
10	0

## What are the limitations of web builders?

Number of Responses: 12

They are great but the options for personalising websites are limited. People can end up with very similar websites as they rely on templates.
They offer limited options.
Not the same as having an experienced web developer who can tailor to your needs.
They are not very sophisticated, and offer the same preset options and templates for every user.
The creator has no ownership of the website.
Low production values. Limited preset options to choose from.
They are very simplistic, not extremely advanced currently.
You are limited to the scope of the web builder.
usually you do'n't have the ability to invent
There is only so much you can do with web builders. Pre-defined options.
Limited customisation options.
Code editing, limited, etc...

**Have you seen any changes in the amount of web development work available during your years as a web developer?**

Number of Responses: 20

Options	Number of Participants
Yes	14
No	6

**Do you think that any of these changes could be attributed to the advancement of web building software?**

Number of Responses: 14

Options	Number of Participants
Yes	10
no	4

**Do you have any concerns about the future of your industry?**

Number of Responses: 19

Options	Number of Participants
Yes	8
no	11

**Do you believe that web builders can now, or in the future reliably replicate the work done by web developers?**

Number of Responses: 20

Options	Number of Participants
Agree	4
Somewhat Agree	9
Disagree	7

## If not, why not?

Number of Responses: 6

They will never be as effective as a web builder.

I don't know much about them. I would imagine if they were a real threat I would have heard a bit more about them.

Software will never be as flexible as the human mind.

They cannot offer the flexibility and bespoke services offered by a developer.

They will always trail behind developers.

A web developer can do more than web builders. These will always be limited, good for creating simple websites, but at the end you can't do advanced stuff.

## Do you believe that all web developers will be replaced by web builders in the future?

Number of Responses: 20

Options	Number of Participants
Yes	1
No	19

## What do you think is the appeal of using a web builder?

Number of Responses: 17

Professional looking sites for cheap.
Fast and cut development time by weeks or months.
Gets tasks done quickly.
It's cheaper.
They are a cheap alternative for smaller businesses.
Easier, less skill required.
They offer an easier way.
Many options, no skills required.
They are very easy to use without experience.
Cost of production is cheap. Timescale is short. Good for people without the know how.
Automating onerous tasks.
Speed of development.
instant satisfaction. Like amateur porn, it might not have all the bells and whistles a big production has but hey "I made it myself and here it is with no waiting".
Relatively cheap. No skill required.
Ease, speed
Easy, no technical skills required.
Create websites quickly and easily.