Major Challenges Currently Facing the Software Industry

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ABSTRACT
66% of software projects fail, according to the Standish Group's 2020 Chaos Report [1]. When we see that number, it comes to our mind the 1968 NATO conference on Software Engineering where leaders came together to discuss the state of software development which they described as "Software Crisis". If more than 50 years from that conference we estimate failed software projects to 66%, we cannot say that the "Software Crisis" is over. To evaluate that statement, we can look at the list of problems that conference listed and see whether they continue to be manifested. The conference formulated that software projects are: Unreliable, delivered late, impossible to maintain, costly to modify, performing at an inadequate level, and exceeding budget costs. Does any of this family of problem sound familiar? This paper surveys major challenges currently facing the software industry.

Categories and Subject Descriptors
A.0.3 [**GENERAL**]: Tech Industry and Development Teams.

General Terms
Management, Customer Experience, Customer Satisfaction, Design, Human Factors.

Keywords
Customer Experience, Software Teams.

1. INTRODUCTION
Software is a complex thing to build and it's highly widespread – everything is run by software and everything is connected by software. This prevalence of software subjects the industry to continuous challenges. They never end but just change over time. This is reason why the software field is a continuous learning field; once you step into it, you need to continuously learn about new challenge and try to find solutions to them.

2. KEY CHALLENGES FACING THE SOFTWARE INDUSTRY

2.1 Cybersecurity Threats
Software has connected the entire world, commercially and socially, through the Cloud. This even got boosted more by the big wave of digitization happened since COVID-19 pandemic. With that came the issue of data being subject to cybersecurity attacks. Verizon Data Breach Investigation Report (DBIR) published 2021 reports that a total of 5,258 data breaches has been confirmed in that year [2]. This is also magnified by the FBI Internet Crime Complaint Center (IC3) stating that it received a total of 28,500 complaints [3]. As security has been more critical and paramount than ever before, the industry is continuously challenged to keep software more secure; however, the subject requires great investment in talents as well as long term prioritization to keep it as part of each delivery and design.

2.2 Talent Shortage and Wide Skill Gap
Talent availability is a very pressing challenge to the industry; this is in terms of both the supply as well as qualification. In the U.S alone, the number of graduates is 400k annually and only 13.2% of schools offer AP computer science courses [4]. A survey done by McKinsey & Company, 87% of organizations are suffering from talent shortage [5]. This is even worst if we consider that not all supplied number of graduates are properly qualified or even possess the right skillset required. According to ComTIA research, 93% of employers report an overall skill gap [6]. Talent availability as well as skill gap can be considered the mother of challenges for the software industry. It will the right supply of highly skilled software professionals, the industry can truly address its own challenges.

2.3 Lack of Data Utilization
Data has came long way and is now central to any software business success. It is through data, software teams can navigate their way, address customer needs, and swiftly mitigate issues. Moreover, data enables manager and leaders to make effective decisions to serve their customers and business. This is while most of software leaders and managers are lacking data literacy skills in their day to day management endeavors. According to a Harvard Business Review study, participants lacked the ability to use data to solve problems and make decisions [7]. Researchers found that participants struggled to: ask the right questions about data, understand what information is relevant, how to validate data, and how to test their hypothesis.

Additionally, companies are investing in building tools for data. However, they do not invest in institutionalizing them or educating their own employees on how to build something useful out of such data.

2.4 Lack of Documentation
Switching to Agile has been one of the most used excused for skipping documentation. Claiming to be following the Agile Manifesto, software teams have kept very minimal documentation to none. Ranging from key requirement definition to technical specs, each team member had their own knowledge about the project and the part they are owning. A study published by Forbes states that common reasons for failing software projects are unclear requirements and lack of detailed planning [8]. This creates confusion and unclarity on the work to be done. Additionally, it makes time estimation and resource allocation extremely inefficient. The problem also becomes worst when dealing with key persons leaving the project or employer, taking with them valuable tacit knowledge.

2.5 Lack of Customer Voice Incorporation
Most software companies have procedures to connect with their customers; either through reviews or customer service agencies. However, companies are struggling to create mechanisms by which they can cascade customer friction areas as well as needs to responsible teams in a proper way. According to Walker's 2020 report, Customer Experience is expected to overtake price and product as the key brand differentiator [9]. Another study by 3Pillar Globe states lack of proper technical documentation is one of the reasons why software projects fail [10]. Given market competition and customers' reliance on software,

failing to continuously incorporate customer needs' and preferences will lead customers to abandon brands and products to better competitors.

2.6 Keeping Pace with Digitization

With COVID-19 more companies have turned towards digitization to enable them to continue to deliver their business. McKinsey Global Survey has shown that many companies did digitization work worth of 3 to 4 years during the pandemic [11]. Comes with this massive wave, new problems to solve and needs for new technology as well as different types of projects. It will also introduce new use cases that teams are not used to and are required to quickly think of processes and better ways to build the features of such use cases.

3. CONCLUSION

The total cost of unsuccessful development projects among US firms is an estimated $260B, while the total cost of operational failures caused by poor quality software is estimated at $1.56 trillion [12]. While software continues to deliver its valuable services to humanity, software professionals are responsible for making sure they are continuously aware of current problems underlying their market or domain so that they can bring to the table viable solutions and engage the right people that could help solve it. This paper aimed at surveying highly cited topics circulating the software industry in an attempt to address them. But it takes full preparation so that we ensure addressing these problems in the best way.

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