

## THE INFLUENCE OF TEAMWORK IN TECH DEVELOPMENT. THE FUTURE OF FULL STACK DEVELOPMENT

Alexia MIHNIOVA, Daneş COŞER\*

Department of Software Engineering and Automation, TI-235, Faculty of Computers, Informatics, and  
Microelectronics, Technical University of Moldova, Chişinău, Republic of Moldova

\*Corresponding author: Daneş COŞER, [danes.coser@isa.utm.md](mailto:danes.coser@isa.utm.md)

Supervisor/Scientific Coordinator: Ala PUŞCAŞU, university assistant, Foreign Languages Department

**Summary.** A detailed analysis of research works dedicated to team formation as a mechanism for effectively utilizing human potential to enhance the quality and efficiency of organizational activities is conducted. It is determined that in the late 20th to early 21st centuries, this topic was actively developed within the framework of management sociology, later in economic, psychological, and less frequently, technical fields of science. The IT department in any company plays a vital role in maintaining operations. IT teams are structured based on specific tasks, including system maintenance, process automation, system integration, and data management which a full stack cannot execute alone whatever skills he developed. Teamwork optimizes IT infrastructure to support business operations effectively.

**Keywords:** IT teams, software engineering, team formation, teamwork, web development

### Introduction

The ability to work in a team is one of the most in-demand skills in development and beyond. Without it, it is impossible to effectively interact with colleagues and achieve work goals. A couple of years ago, the recruiting company Hays conducted a survey, the results of which showed that the ability to work in a team ranks first among soft skills in the list of employer requirements - considering that 96% of employers recognize soft skills as more important than hard skills [1].

The standards of teamwork in the modern business environment continue to evolve. Teams are becoming increasingly cross-functional, and the culture of interaction among participants is developing. A leader can no longer dictate terms firmly, as the industry has a wide range of work choices and one can easily quit in favor of another employer.

Consequently, team members require more awareness, proactivity, and at the same time - readiness to listen to each other. In any company, employees who can negotiate with colleagues and effectively interact in a group are valued. The contemporary trend of digitalization encompasses all sectors of business, ranging from finance and healthcare to transportation and production. However, the transition to digital transformation within companies is impractical without proficient IT specialists. Consequently, IT teams have become an integral component of the structure of most organizations.

Indeed, each company is distinctive, with its business objectives, encountering various challenges, and consequently adopting diverse technologies. This leads to disparities in the structure and size of their IT departments, which can significantly differ from one another. Nevertheless, certain common patterns can be identified. Typically, teams are formed around specific functions.

### The organization of the work process in a team during an IT project

A Full-stack developer is like a versatile warrior who best handles the stage of web service development at the beginning of the project's lifespan. Such a specialist is responsible for about everything that it takes to create and run a site.

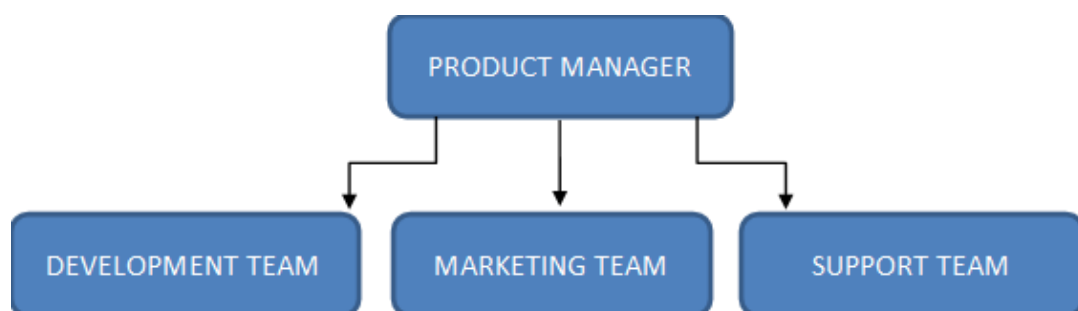
It turns out that a full-stack developer can work with a variety of technologies and replace two specialists at once: frontend and backend developers. However, a Full Stack developer may not possess as deep knowledge of technologies as a specialist in a specific area, but they have enough to implement a project.

On the downside, being a full-stack developer means spreading oneself across multiple domains, while in some rare cases, it has happened, no single individual can consistently be a cut above a dedicated frontend or backend developer. This breadth-versus-depth trade-off can sometimes result in challenges, particularly in handling complex or specialized tasks. Multitasking has been found to increase the production of the stress hormone cortisol as well as the fight-or-flight hormone adrenaline, which can overstimulate your brain and cause mental fog or scrambled thinking. Multitasking creates a dopamine-addiction feedback loop, effectively rewarding the brain for losing focus and constantly searching for external stimulation [1]. While common perception might envision the IT department as a group of technology experts. These jobs not only have up-to-date technical skills, but also creativity, specialized knowledge of specific technologies, and a strong grasp of soft skills.

The most common professions are project managers responsible for planning and executing all project tasks. They coordinate the work of different teams, monitor all processes, and ensure that everything is completed within set deadlines and budget, so when people believe they are in control, they tend to work harder and push themselves more [2]:

- 1) IT Analysts analyze all organizational processes in the company, study existing information systems, and search for opportunities to optimize work.
- 2) Developers are the ones who write code. They create software using various programming languages. Back-end developers build the internal logic and functionality of the product, while front-end developers work on the elements with which users interact.
- 3) QA specialists ensure the quality of the product, test it and identify defects that need to be addressed.
- 4) UI and UX designers focus on effective interaction between end users and the application. They design the interface in such a way that the product looks attractive and is easy to use.
- 5) Data analysts collect, verify, and analyze data, allowing companies to make decisions based on it.
- 6) Solution Architects design IT systems and ensure that innovative solutions work well with those already used in the company.
- 7) Cybersecurity specialists protect organizations from cyber threats and attacks. Their task is to anticipate and prevent potential problems.
- 8) IT administrators are responsible for installing, maintaining, and configuring hardware, software, and networks in the company.

In organizations where modern approaches are used, the responsibilities of some specialists, such as developers, administrators, and quality assurance specialists, may overlap, but should never be fused into one single job title.



**Figure 1. The structure of the IT project team**

Big IT companies invite specialists to analyze how teams work to facilitate and make their work more efficient. In one of Google's Projects called Aristotle, the main goal was to figure out how to build the perfect team. The studies have shown that who was on the team did not matter at all, because there were not any correlations between team memberships and team success. In fact, a team's composition holds much less importance than the quality of interactions among its members. Equality in conversational turn-taking and ostentation listening are two major factors that influence the quality of the collaboration in a team because they create what psychologists call psychological safety. It is viewed as the single greatest correlation with a group's success because it reviles the best ideas, the ability to work together, and innovative capacities.

### The Future of the Full-stack Development

The role of a full-stack developer has undergone significant changes since its inception due to the continuous progress of technology in the field in which it operates. While in the early 2000s, a full stack developer primarily worked with more traditional languages such as HTML, CSS, and JAVASCRIPT, with the addition of the backend PHP and JAVA [5], a modern developer on the other hand is expected to be proficient in a wider array of technologies, including but not limited to front-end and back-end frameworks. Additionally, it is a must to have a good grasp on server-side development, version control systems, and many others that have become indispensable to creating and deploying sustainable applications [Fig 2].

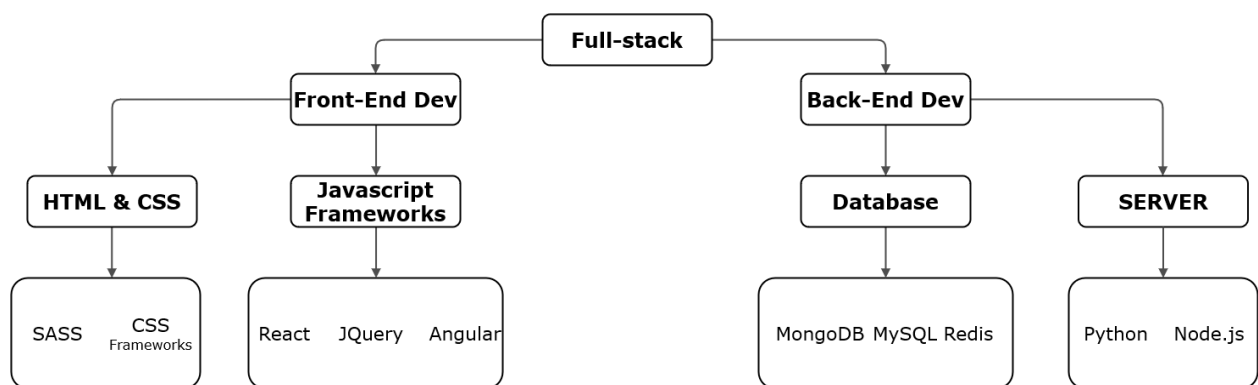


Figure 2. The technologies a modern full-stack developer uses

The emergence of new tech is not the only limiting factor, even though technical proficiency is the main deciding factor, soft skills remain an essential skill when working in a cross-functional team environment. In recent times, there has been greater emphasis on soft skills such as problem-solving, communication, and adaptability to deliver a better product. Problem-solving is essential in identifying and finding a solution within a reasonable time limit, but effective communication is vital when explaining programming concepts to non-technical team members.

Most important of all has become adaptability, the separating factor that sets exceptional developers apart. In this fast-paced world that we live in, where new frameworks and tools can disrupt the market, one's ability to quickly learn and adapt to the current trends, whilst continuing to hone what one already knows is a valuable one. Even more so when the emerging tech is integrated into the workflow to remain up-to-date and competitive.

Likewise, according to the Stack Overflow Developer Survey for 2023 [6], the number of developers considering themselves as full-stack developers has seen a decline, with approximately 33.5% identifying with this role from the previous 55%. While this figure marks a decrease from the previous years, it only serves to underscore the industry's wants and needs, leading to growing specialization solely back-end or front-end [Fig 3].

### Developer type

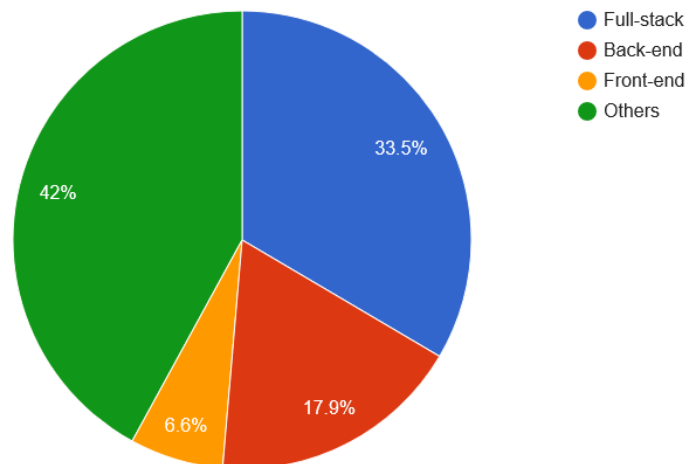


Figure 3. Stack Overflow Developer Survey for the 2023 results [5]

Because of the decline in percentage, full-stack developers remain vital in bridging front-end and back-end development, encouraging collaboration, and striving for innovation. As the industry evolves, their versatility and adaptability continue to be indispensable, ensuring seamless integration of technologies [Fig 4].

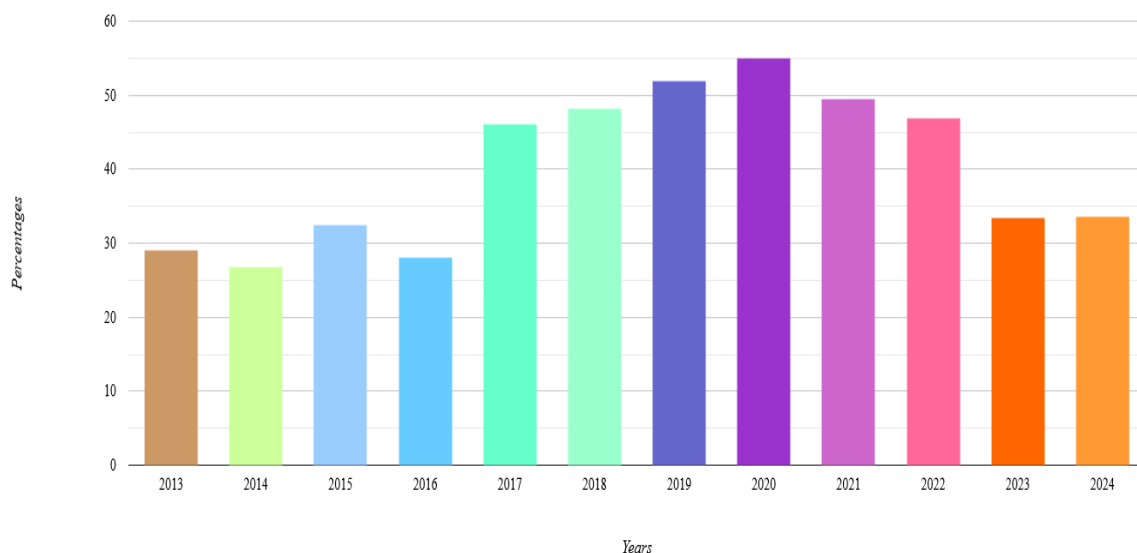


Figure 4. Stack Overflow Developer Survey results from 2013 to 2024

### Conclusions

In this paper, we have explored the influence of teamwork in the tech space and examined the evolving role of full-stack developers in modern technology environments. We have observed the vital role of teamwork in streamlining organizational efficiency and how to implement it inside IT departments to foster innovation. Alongside that, we have uncovered insights into how the role of a full-stack developer has undergone changes throughout the years and what we can expect from it in the future. We've observed how professionals must adapt to the changing landscape of technology space, bridging the gap between front-end and back-end. Looking at the future, we anticipate full-stack developers to become essential members of IT departments as their responsibilities and array of skills continue to grow. Overall, our findings underscore the indispensable nature of teamwork in the tech industry and the ongoing evolution of the full-stack developer role in shaping the world as we know it.

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