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FACULTY OF SOCIOLOGY AND SOCIAL WORK  
DOCTORAL SCHOOL OF SOCIOLOGY**

**MENTAL HEALTH, WORK-LIFE BALANCE, AND DIGITAL  
BEHAVIORS IN SOFTWARE DEVELOPMENT: A MIXED-  
METHODS STUDY OF INDIVIDUAL AND  
ORGANIZATIONAL FACTORS, IN A SOCIOLOGICAL  
CONTEXT**

**SUMMARY OF DOCTORAL THESIS**

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## Table of contents

|   |           |
|---|-----------|
| <b>1. INTRODUCTION</b>  | <b>5</b>  |
| <b>2. KEY CONCEPTS AND EMPIRICAL CONTEXT</b>                                  | <b>6</b>  |
| <b>2.1. Sociology of work</b>   | <b>6</b>  |
| <b>2.2. Women in the world of work</b>  | <b>7</b>  |
| <b>2.3. The ideal worker</b>  | <b>8</b>  |
| <b>2.4. Work and organizational life in the software development industry</b> | <b>8</b>  |
| 2.4.1. The studied organization   | 9         |
| 2.4.2. Organizational culture   | 12        |
| 2.4.3. Wellbeing  | 17        |
| 2.4.3.1. Work conditions  | 17        |
| 2.4.3.2. Effect of long working hours   | 17        |
| 2.4.3.3. Work life balance  | 17        |
| 2.4.3.4. Stress and coping  | 18        |
| 2.4.3.5. Social isolation   | 19        |
| 2.4.3.6. Financial wellbeing and gender diversity                             | 20        |
| 2.4.3.7. Gender diversity   | 22        |
| <b>2.5. Literature review based on systematic search</b>                      | <b>23</b> |
| 2.5.1. Internet addiction   | 28        |
| 2.5.2. Social media addiction   | 54        |
| 2.5.3. Online gaming disorder   | 57        |
| 2.5.4. Smartphone addiction   | 59        |
| 2.5.5. Work addiction   | 61        |
| 2.5.6. Organizational culture   | 61        |
| 2.5.7. Work life balance  | 63        |
| <b>3. RESEARCH DESIGN AND METHODOLOGY</b>                                     | <b>66</b> |
| <b>3.1. Research questions and hypotheses</b>                                 | <b>66</b> |
| <b>3.2. Research methodology and process</b>                                  | <b>66</b> |
| <b>3.3. Data collection tools</b>   | <b>70</b> |
| <b>3.4. Participants</b>  | <b>71</b> |
| <b>3.5. Sampling</b>  | <b>71</b> |

|   |            |
|---|------------|
| <b>3.6. Ethical considerations</b>                  | <b>72</b>  |
| <b>4. FINDINGS</b>                                  | <b>72</b>  |
| <b>4.1. Qualitative analysis</b>                    | <b>72</b>  |
| 4.1.1. Flexibility                                  | 79         |
| 4.1.2. Work life balance                            | 82         |
| 4.1.3. Handling 24/7 availability                   | 89         |
| 4.1.4. Options to further improve work life harmony | 93         |
| 4.1.5. Working from office                          | 95         |
| 4.1.6. Working from home                            | 99         |
| 4.1.7. Productivity                                 | 104        |
| 4.1.8. Stress                                       | 105        |
| 4.1.9. Coping                                       | 106        |
| 4.1.10. Culture                                     | 108        |
| <b>4.2. Quantitative analysis</b>                   | <b>111</b> |
| 4.2.1. Descriptive statistics                       | 111        |
| 4.2.1. Correlation analysis                         | 118        |
| 4.2.1. Cluster analysis                             | 119        |
| <b>5. Limitations</b>                               | <b>131</b> |
| <b>6. Next steps</b>                                | <b>131</b> |
| <b>7. References</b>                                | <b>132</b> |

**Keywords:** software development, work life balance, hybrid work, mental health, behavioral addictions

## **Introduction**

Software development, steadily growing with the advancements of information technology, is a niche profession less studied with regards to mental health. Although being a highly paid profession, it is also a very stressful one, balancing work on complex problems while satisfying the needs of customers. The need of working with different tools and technologies, fragmented work due to frequent meetings with collaborators and the hybrid work setup with an increased need of being responsive to instant messaging, and reduced social interactions with colleagues have an effect on their mental well-being (Wong et al, 2023). Even compared to other high-knowledge jobs like mechanical engineering, anxiety levels of software developers are significantly higher, and their mental well-being is significantly lower (Nayak, 2014). This negative stress, also known as distress can be found in all phases of the software development lifecycle and has different sources: during the requirements definition phase developers are anxious to anticipate the needs of the users, which are often ambiguous and constantly changing; during the coding phase developers are irritable due to the struggle to find the best solution to the high level design; while during testing stress comes from the need of tying the loose ends and make a complete package out of the solution (Glass, 1997). Constant distress can cause to anxiety (Patriquin et al, 2017) and depression (Van Praag, 2004). Ways of coping with the stress and anxiety can lead to behavioral addictions. These addictions have the same effect as substance addiction, they produce an intense activation of the reward system, creating feelings of pleasure while neglecting normal activities (American Psychiatric Association, 2013).

The thesis consists of 6 chapters, covering key concepts in the second chapter, starting with sociology of work and the ideal worker, then introducing the studied organization and it's different aspects, like organizational setup, organizational culture, wellbeing of the employees including flexibility, work conditions, work life balance, stress and coping, effects of long working hours, social isolation and financial wellbeing, research design and methodology in the third chapter, detailing the research questions and hypotheses and the methodology and tooling used, interviews focusing on the work life balance, stress and coping methods and on the organizational culture, and survey focusing on mental health, behavioral addictions, work life balance and organizational culture, and also detailed process description for collecting the data; the fourth chapter containing the findings of the research, the qualitative analysis, focusing work life balance, flexibility and coping with the always on culture, as well as the quantitative analysis results including descriptive

statistics, correlation analysis and clustering; the fifth chapter summarizing the results; chapter six listing the limitations of the current research, while the seventh, last chapter contains and future work and proposed next steps.

## **Key concepts and empirical context**

Human's uniqueness lays in their productivity, they can produce, not only consume. This basic production, also called work, needs interaction with others, organization and cooperation. Work in modern society is enabled by employment, where capital meets available labor. Capital wants to buy as much labor as possible for as little money as possible, while the employee wants to sell his/her labor for the highest price, according to Marx's theory. Capitalism brought the division of labor, where breaking down the task of manufacturing an object from start to finish into smaller subtasks where individual workers would perform these as routines instead of generalization, resulted in both increasing the production speed and reduction of labor costs, as less skilled workers were needed. Along with greater division of work, rationality together with the increased need for efficiency, supported the emergence of bureaucracy, where there is a formal process for everything, decisions are made objectively, based on rules, and people's place in the world of work is based on their qualification, on meritocracy, as per Weber. Work got more and more subject to control, supervision and simplification, not taking into account the worker's identity, leading to Bourdieu's theory of the importance of worker's feelings and ideas connected to the work they do (Strangleman & Tracey, 2008).

The developments in technology gave a boost to the industrial societies, minimizing hazardous work, replacing disagreeable tasks with machines, but also reducing the amount of paid work. As a next step with technological advancements, especially in the area of information technology, allowing greater level of rationalization, came the realization that work is not only about manufacturing, but also services. The modern, post-industrial world is more about services than manufacturing, moving away from older forms of industry such as coal, iron and steel towards sectors requiring a more educated and trained labor force. We see a shift from fordism, where we have mass-produced standardized products by semi-skilled labour we move to post-fordism where production is competing based on quality created by highly-skilled flexible labour.

The flexibility that is needed for these made capital owners realize that work can be divided not only task-wise, but also geographically, moving from single-module traditional factories to a set

of modules connected to different production processes, postmodern factories becoming networked enterprises, virtual organizations, supported by decreasing transport costs and advancements of information technology.

The geographic spread of global organizations, the use of modern information technology and the increase of white-collar work creates a new type of worker, the teleworker, where employees are working at home or from home, with computers linking them to their colleagues and employer.

Women's preferences, attitudes and opportunities toward work are influenced by their roles and societal expectations. According to the social role theory, the differences between women and men in the economic world of labour emerge from the norms and expectations towards their family and economic roles. While women, being the primary caretakers in a family, are expected to learn domestic skills like cooking, men, being more likely to be employed full-time, gain marketable skills. According to the status characteristics theory, members of a task oriented group expect people with different characteristics, like being male, more educated and in a prestigious occupation to be more competent than their counterparts with other characteristics. Even though women earn undergraduate and graduate degrees similar to men, there is a significant difference in the fields of study they chose. For example, in the '90s, only around 30% of women chose a career in engineering, military, technology or computer science (Powell, 1999).

The concept of ideal worker was introduced in 2021 by Minnotte & Minnotte, a person people fully devoted to their work, always focused on their task, always available, working long hours, never taking time off, and prioritizing their career as opposed to family or personal responsibilities. The ideal worker norm emerged when the classic family setup was of the mother taking care of the home and family with the father having the earner responsibilities (Minnotte & Minnotte, 2021).

The ideal worker norm led to the long hours culture, where companies are expecting their employees to be dedicated and to work long hours, often more than 48 hours a week (Watson, 2017).

Even if the workplace offers flexibility, like part-time work, parental leave, working from home, employees who take advantage of those get the flexibility stigma, they are perceived as uncommitted, they can feel unfair treatment or face discrimination. If it is men using the flexibility offered by their employer, they are also perceived as less masculine.

Software development is a niche industry employing highly skilled labor in high demand. It is using latest information technologies and has digitalized processes. It usually employs resources from all around the globe, the technology advancements making it possible to work anytime from anywhere.

Organizational culture is created by the organization over time, based on its adaptation to changes in the environment and overcoming challenges. (Cameron & Quinn, 2011). Organizational culture encompasses the ingrained values, underlying assumptions, expectations and norms defining both the organization and the members. It gives a sense of identity to its employees and provides guidelines for getting along within the organization. The culture of an organization is represented by its value, its leadership styles, the common language and symbols being used, its processes and the definition of success. Even within an organization, there are different groups, subunits having different culture, these differences becoming visible in the collaboration difficulties or conflicts, each of the subunits having developed its set of values and perspectives, however all these subunits also have common elements typical for the whole organization's culture, this will be the underlying glue keeping the organization together.

Cameron and Quinn define four types of organizational culture: the clan culture, where focus is on teamwork and the leaders mentor the organization; the adhocracy culture where focus is on innovation and quick adaptability; hierarchy culture driven by processes; market culture driven by transaction costs.

Wellbeing of employees includes several aspects like work-life balance, stress and coping strategies, social isolation, and financial wellbeing. Most focus of the current study is on work life balance. The studied organization puts significant focus on its employees' work life balance, acknowledging the risk of long working hours and stress. Software development is a highly stressful work, stress factors including demanding deadlines, constant interaction with customers and deep and complex technology competence. High mental load can lead to addictions, especially digital addictions. Addictions can be characterized by excessive and compulsive behavior, leading to significant damage in one's life. Behavioral addictions have similarities with substance use disorder, with symptoms such as salience, mood modification, tolerance, withdrawal symptoms an conflict and relapse.

In the current study we cover internet addiction, social media addiction, online gaming disorder, smartphone addiction and work addiction.

Internet addiction is one of the most studied digital addiction, with prevalence of moderate to severe internet addiction prevalence ranges between 1%-86.33% with an average of 28.56% in adults, considering moderate to severe addiction levels. In the adult population, there is a significant association between problematic internet use and eating disorder, depression and anxiety, poor sleep quality, hikikomori traits (social withdrawal), loneliness, less physical activity, gambling, dry eye disease, ADHD, autism, psychosomatic disorder, suicidal behaviour, aggressiveness, secondary psychopathy, confused self-identity. Protective factors are family affective involvement and openness, high level of religious and existential well-being, support from friends, established self-identity as well as agreeableness and conscientiousness. Risk factors are depression, hikikomori traits, alexithymia, experiential avoidance, social incompetence, egocentricity, insecure attachment, autism spectrum disorder, ADHD as well as neuroticism and extraversion.

Prevalence of social media usage is between 2.9%-55.2%. In the adult population, social media addiction is associated with anxiety and depression, somatization, neuroticism, food addiction and negative academic performance. Risk factors are usage of Instagram, trait FoMO (Fear of Missing Out) and history of adverse childhood experiences. Preventive factors are good family functioning, social support from family and from significant other.

Prevalence of internet gaming disorder is between 2.2%-27.4%. Problematic online gaming is associated with anxiety, poor sleep quality and depression.

Risk for developing online gaming disorder includes poor mental well-being, mild to moderately severe depressive symptoms.

Prevalence of smartphone usage is between 20.3%-29% in adults. Risk factors are loneliness, depression, anxiety and internet addiction, while physical activity is a preventive factor.

Smartphone addiction is associated with internet addiction, anxiety, poor body image, poor health, low mood, tiredness, loneliness and phubbing (ignoring someone physically present while paying attention to your phone). Risks for smartphone addiction include neuroticism and openness.

Work life balance satisfaction leads to better employee performance, motivation, job satisfaction. There is a gender difference in work life balance, men usually report higher work life balance than

women. Women often integrate their work and family nurturing roles, especially when they have younger children, and they also rely on extensive family/friend support. Age also has an impact on work life balance, as people aged 50-55 yrs and above report higher work life balance satisfaction.

## **Research methodology**

The research is an exploratory study focusing on software developers' work-life balance, mental health and digital behaviors both individually and in context of the organizational environment.

A mixed method was used for this exploration, consisting of a qualitative part, interviews with employees of the Hungarian and Indian research and development organization, focusing on the work life balance, stress and coping methods and on the organizational culture, and the quantitative part, a survey administered to the same pool of employees, focusing on mental health, behavioral addictions, work life balance and organizational culture.

Research questions are exploring the factors contributing and hindering work life balance for software developers, and coping methods for surviving the always-on culture.

We also had a hypothesis stating that there is a positive correlation between mental health disorders and behavioral addictions in software developers.

## **Summary of findings and concluding remarks**

Areas of most interest in the qualitative analysis are the need to always be online and available in contrast with flexibility and work life balance, and how organizational culture enables this.

Participants from Hungary work on average 43.03 hours per week, with as low as 34 hours and as high as 50 hours. Leaders work on average 43.96 hours a week, while individual contributors, non-leaders work on average 40.25 hours a week. The Hungarian leaders have a harder time to keep the 40 hours per week, they state that they try consciously work on keeping their worked hours closer to the target of 40.

The participants from India work an average of 47.6 hours per week, with as low as 40 and as high as 70 hours. The 70 hours maximum was stated by only one participant, the maximum for the rest was 55 hours. The leaders in India need to prioritize calls in the evening due to the timezone differences, but they also try to compensate during the week, same as their counterparts in

Hungary. Typically, these more hours spent on work are not reported in the internal time reporting system, even though there is the possibility to do so, and the extra time spent on work (not mandated overtime) is cumulated and can be taken off at a later date anytime. Some of the employees are using this system to balance the more demanding weeks.

While analysing the work life balance factors, a recurring theme of flexibility came up. Participants mention both place flexibility, meaning they can work from anywhere, either from home or at the office, and time flexibility, meaning they can work asynchronously, any time they choose, there is no core time. Taking care of minor personal or family-related issues during the working day in this flexible setup is highlighted by many participants. This flexibility also softened the impact of the newly introduced 3 days a week working from office directive. Participants mention the trust that they receive from their managers in deciding the office and home office days. Women raising small children use the flexibility, to integrate their roles of mother with the work role, however male participants also mention flexibility for being able to care for a child.

The dark side of flexibility, is that it comes with stretching the working day, blurring the border between work and non-work related activities.

The constant demand of availability comes with long working hours, that affect employee health if it's done too often. The stretching of the working day, the blurring that comes with the flexibility can have an impact on the balance between work and life. Overall sentiments regarding work life balance were positive. Due to the flexibility, the balance between work and non-work activities feels more like harmony, and it needs to be a conscious decision. The interview participants, being mostly engineers, set up a structure around their days and introduce routine helping them harmonize their activities, structure in planning one's calendar, especially when working with different timezones is contributing to making other colleagues aware of non-working hours. Detaching oneself from work, is another way of contributing to this harmony.

Leaders have a higher sense of responsibility towards the work, meaning they take project deliveries into account much more when, for example, planning for longer leaves. There is also the personal ambition level, seen especially in leaders. Along with sense of responsibility, comes more work as well. This extra load can become a hindering factors in achieving work life harmony. Hindering factors for achieving work life harmony are high expectations on availability, higher in operational roles, as well as fear of missing out. However, the overall sentiment about work life

balance is more positive than negative, being also due to the company culture promoting mental health.

Since the pandemic, the expectation to be available 24/7 is still persistent. This is especially true for senior leaders and is also needed because of the setup with collaboration between employees working in different timezones. From an employer's perspective, this setup enables innovation and making sure all perspectives are taken into account when solving problems, while from an employee's perspective it on one hand increases their visibility and presents a growth opportunity, and on the other hand is the source of obligation to stay accessible. Solution strategies to the 24/7 availability need are defined by consciously deciding when to say no or to delay work, and also by the different non-work roles employees have, like being parents, children or friends. Context switching between work and non-work modes many times involves physically switching.

The hybrid setup, working 3 days from the office and 2 days from home is seen as a productivity increasing setup, bringing out the best from both worlds: focus timew when working from home and collaboration when working in the office.

Organizational culture supports this sense of wellbeing, participants mention trust and respect, working towards a common goal, transparency, and manager's supportive behavior as the organizational/team culture, building psychological safety. This is in line with the clan culture definition. Common norms found during the interviews are individual and shared responsibility, helping each other, prompt feedback and celebrating together.

The quantitative analysis focused on mental health and behavioral addictions and the hypothesis. Mental health results show that 4% of the participants have moderate anxiety level, 8% have moderate depression level and 2% have mild depression levels. Only 2% of the respondents reported mild stress level. 6% of the participants are at risk of work addiction. Regarding screen addiction, most of the participants 20.4% have a high frequency of series watching, while 16.3% have a high frequency of smartphone usage. For social media usage, 6.1% of the participants have high frequency usage, and 2% are at risk of online gaming addiction. Regarding internet addiction, we used the cutoff rate of 70 for high risk and 40 for moderate addiction. 2% of the participants have severe, while 36.7% reported moderate addiction levels.

While series watching engagement, social media addiction, internet addiction and online gaming addiction prevalence are in line with the results of the systematic review, smartphone addiction prevalence in this study is lower than the results shown in the systematic review.

32.4% of the participants have high social loneliness scores.

81.6% of the participants scored high on the work life balance questionnaire and almost all, 91.8% of participants have high resiliency scores.

Even though the total number of participants were below the targeted number, we performed statistical analysis of the survey results. There is a significant correlation between anxiety and social media usage ( $p=0.035$ ), online gaming ( $p=0.027$ ), smartphone usage ( $p = 0.01$ ) and internet addiction ( $p<0.001$ ). There is a significant correlation between depression and work addiction ( $p=0.047$ ) and social media usage ( $p=0.030$ ). There is also a significant correlation between stress and work addiction ( $p=0.040$ ). Regarding social loneliness, it is significantly correlated with social media addiction ( $p=0.028$ ) and internet addiction ( $p=0.005$ ). Hypothesis is partially true.

Regarding work life balance, there was no significant correlation shown with age or gender of participants.

Performing a cluster analysis, we found that younger responders, who also have less responsibilities, having homogenous medium work life balance, while older responders have low, medium and high work life balance.

Main limitation of the current study is that we did not manage to reach a large enough population with the quantitative method, the survey, and we were not able to achieve any significant results from the statistical analysis. Another limitation was that most of the participants were leaders, senior developers and it is only their views we managed to analyze from the interviews.

As a next step the plan is to share the results of the analysis to leaders of both sites, and perform a focus group discussion with the leadership teams to understand the results, brainstorm on possible organizational improvements further supporting the work life harmony of the employees, but also to discuss ideas for continuing research in this topic. Furthermore, as a continuation of the current research, it would benefit to conduct interviews on the same topic, possibly expanded based on the focus group discussion, with the younger generation of employees, specifically with generation Z

to assess the generational differences, and the commonalities between similarly aged junior employees on the two sites.

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