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COMPARING POST-KEYNESIAN AND NEW-KEYNESIAN PARADIGMS IN MONETARY POLICY

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ABSTRACT

The changing global economy often requires a review of monetary policy frameworks, stressing the importance of clear theories and practical use. This paper aims to understand how different Keynesian-based theories tackle modern economic issues, especially in managing inflation, unemployment, and financial stability. Although both Post-Keynesian and New-Keynesian theories stem from Keynesian economics, they offer different methods and policy suggestions based on their unique theoretical bases. This paper addresses a gap in current research by providing a systematic comparative analysis of how Post-Keynesian and New-Keynesian frameworks influence real-world monetary policymaking, especially during financial crises and periods of structural economic change, areas often discussed separately but not directly compared. It outlines the theoretical assumptions, policy tools, and economic impacts of each school, offering a clearer understanding of their practical relevance. This comparison is vital for policymakers and economists facing complex economic conditions who require robust and flexible theoretical guidance. This study reveals that while both approaches contribute valuable insights to economic policymaking, they diverge significantly in their own perspectives on economic stabilization and crisis response. Post-Keynesians emphasize monetary endogeneity and the remediation of structural fragilities, whereas New-Keynesians prioritize market imperfections and expectation management via policy instruments.
Keywords: Monetary Policy, New-Keynesian, Post-Keynesian

INTRODUCTION

Monetary policy is a key tool in managing the economy, affecting national economic trends by regulating money supply and interest rates. Central banks use it to control inflation, manage employment, and ensure economic stability. It also impacts daily life through borrowing costs, savings, and investments. Therefore, considering its theory and practice is important for economists, policymakers, and the public (*Boyarchenko et al.,* 2022).

In recent years, the global economy has faced significant challenges that have tested existing monetary policy frameworks. Reviewing this area is important for several reasons. The 2008 Global Financial Crisis (GFC) showed that neoclassical economic theory's market mechanisms do not guarantee market stability. The instability of the financial sector also destabilized the real economy. To address the GFC, central banks used monetary policy tools not employed in decades. The liquidity trap, known as the zero lower bound after Keynes, forced central banks to rethink their policies (*Novák & Tatay,* 2021). The economic stagnation from the COVID crisis also required new economic recovery tools.

The COVID-19 pandemic caused a severe economic downturn, leading to high unemployment rates, disrupted supply chains, and increased financial instability. Central banks worldwide responded with drastic measures, such as cutting interest rates to near zero, large-scale asset purchases, and providing liquidity support to financial institutions (*Baldwin & Weder di Mauro,* 2020). At the same time, economies are facing rising inflation due to expansive fiscal policies, ongoing supply bottlenecks, and changes in consumer demand (*Gopinath,* 2022).

The aftermath of the COVID crisis, followed by the 2022 conflict, led to a rapid increase in inflation, prompting economic policymakers to act. However, these monetary policy responses have caused economic stagnation. Many government budgets are heavily indebted, limiting their flexibility. Nearly a century after Keynes's crisis solutions, developed countries face additional challenges such as an aging population (*Tatay & Kazinczy,* 2023).

In our view, economic policy interventions are needed to ensure the equilibrium of economies and promote growth in a sustainable way. These developments have reignited debates about the effectiveness of traditional monetary policy tools and the theoretical paradigms that underpin them.

This paper explores the economic role of monetary policy by comparing two key schools of thought: Post-Keynesian and New-Keynesian economics. Both are based on Keynesian economics, developed by John Maynard Keynes after the Great Depression. Keynesian theory highlights the importance of aggregate demand and supports active government intervention to manage economic fluctuations, differing from classical economic theories that preferred limited government involvement (*Aspromourgos,* 2019).

As policymakers tackle post-pandemic recovery, inflation, and financial stability, reassessing monetary policy theories is crucial. Post-Keynesian and New-Keynesian approaches, both rooted in Keynesian economics, differ in assumptions, methods, and policy recommendations. Post-Keynesian economics focuses on uncertainty, money creation, and income distribution (*Lavoie,* 2014). New-Keynesian economics emphasizes price stickiness, rational expectations, and market imperfections (*Woodford,* 2003).

The central research question guiding this paper is: How do Post-Keynesian and New-Keynesian approaches to monetary policy compare in terms of their theoretical foundations, methodologies, and implications for economic policymaking? By exploring this question in the context of recent economic challenges, the paper aims to provide a structured comparison of these two paradigms. It will analyze their distinct assumptions, the role they assign to central banks, and their proposed solutions for addressing contemporary issues such as inflationary pressures, unemployment, and financial instability. Ultimately, this analysis will offer valuable insights into ongoing debates within the field of economics and deepen our understanding of modern monetary policy.

LITERATURE REVIEW

Monetary policy frameworks have been shaped by Post-Keynesian and New-Keynesian theories, but some aspects are misunderstood. Post-Keynesian critiques of mainstream policy, focusing on uncertainty and endogenous money creation, are often overlooked. Similarly, the New-Keynesian emphasis on microfoundations and rational expectations can overshadow macroeconomic dynamics, especially during financial instability. Previous studies mainly focus on theoretical differences without fully exploring the practical implications. This review aims to highlight the key differentiations between the two schools of thought while emphasizing the research gaps that this paper seeks to address.

Keynesian Economics

Keynesian economics, developed by John Maynard Keynes during the 1930s Great Depression, revolutionized economic thought and policy. In 'The General Theory of Employment, Interest, and Money,' Keynes critiqued classical theories. His ideas continue to shape economic policy today.

Keynesian economics posits that aggregate demand drives economic activity and employment. Unlike classical economics, which assumed markets naturally reach full employment, Keynes argued that low demand can lead to high unemployment. This perspective shifted away from laissez-faire principles, emphasizing the necessity for government interference to stabilize the economy (*Trautwein,* 2020).

To provide a concrete representation of the Keynesian framework, the IS-LM model (Investment-Saving and Liquidity Preference-Money Supply) is often employed. This model illustrates the interaction between the real economy (goods market) and the monetary economy (money market). The IS curve represents equilibrium in the goods market and is defined by the equation:

$$Y = C(Y - T) + I(r) + G \tag{1}$$

where Y is the national income (output), C is consumption, a function of disposable income $(Y - T)$, $I(r)$ is investment, which is inversely related to the interest rate (r), G is government spending, and T is taxes. The LM curve represents equilibrium in the money market and is expressed as:

$$\frac{M}{P} = L(Y, r) \tag{2}$$

where M is the nominal money supply, P is the price level, $\frac{M}{P}$ is the real money supply, $L(Y, r)$ is the liquidity preference, or demand for money, which depends positively on income Y and negatively on the interest rate r. The intersection of the IS and LM curves determines the equilibrium levels of income Y and the interest rate. This model demonstrates how fiscal policy (changes in G or T) and monetary policy (changes in M) can influence aggregate demand, and consequently, output and employment.

A fundamental concept in Keynesian economics is the multiplier effect. This principle indicates that an initial rise in spending results in higher income and consumption, which in turn stimulates more economic activity and creates a greater overall impact on the economy.

Another important idea in Keynesian economics is the liquidity preference theory (*Bibow,* 1998). This theory explains how interest rates influence the demand for money. Keynes proposed that the demand for money L consists of three motives: transactions, precautionary, and speculative, which is a function of income and interest rates:

$$L = L\_1(Y) + L\_2(r) \tag{3}$$

where $L\_1(Y)$ represents the transactions and precautionary motives (dependent on income), $L\_2(r)$ represents the speculative motive (dependent on the interest rate). This theoretical framework elucidates the relationship between monetary policy, interest rates, and economic activity, while providing a basis for understanding central bank functions in economic management (*Tily,* 2007a).

Keynes challenged the neoclassical view of interest rates as solely determined by savings and investment. He argued that collective saving is constrained, as one person's consumption affects another's income, impacting overall savings. While individuals decide their money holdings, they must collectively hold the total money supply. Keynes posited that interest rates have a limited impact on consumption and are instead determined by the balance of money demand (liquidity preference for transactions, precaution, and speculation) and the fixed money supply. Expectations play a crucial role, as shifts in expectations alter money demand and thus interest rates, influencing investment decisions through the relationship between the marginal efficiency of capital and loan interest rates.

Keynes divided the cash holdings of individuals into two parts, denoted M_1 and M_2. One, M_1 is the stock held for the business and prudence motive, the other, M_2 is the stock held for the speculative motive. A liquidity function was assigned to each of the two money holdings. The L_1 function associated with M_1, depends primarily on income Y. L_2, which determines M_2, depends on the relationship between the current interest rate r and the expectation of its change. If M is the total stock of money held by the individual, then:

$$M = M1 + M2 = L1(Y) + L2\,(r) \tag{4}$$

We need to examine how M is affected by changes in Y and r and the shape of liquidity functions. The quantity of money M changes with Y and r, new money generated can buy securities and other assets until r falls to a level where increased income absorbs the new money. This may increase $M2$ or $M1$ due to higher income. Banks might cut interest rates, leading someone to sell a bond or debt security. Changes in M occur as r changes, establishing a new equilibrium. Speculative demand for money is driven by uncertainty about future interest rates. According to Keynes, $M2$ is determined by the deviation of the current interest rate from an acceptable value, not its absolute value. A fall in the interest rate reduces the premium for foregoing liquidity, as lower rates compensate less for illiquidity risk.

The fiscal authority can set the short-term interest rate effectively because economic agents accept that the policy will not change in the short run, and short-term interest rate changes cause only small losses. Long-term interest rates are harder to control, especially if agents do not consider the rate acceptable in the long run. If the interest rate falls too low, speculative money demand may become endless. However, Keynes believed a reduction in the interest rate is feasible if it is credible to economic agents. He called the interest rate a convention-based phenomenon, with its effective size determined by expectations (*Novák & Tatay,* 2021).

Keynesian economics acknowledges the influence of expectations on economic behavior. Keynes's concept of "animal spirits" describes the psychological factors influencing economic decisions, such as investment, recognizing the inherent uncertainty in forecasting future economic conditions (*Barnett,* 2017).

Post-Keynesian Economics

Post-Keynesian economics, an outgrowth of Keynesian thought, arose in the mid-20th century as a critique of both classical economics and early interpretations of Keynes. It sought to address perceived misinterpretations by the neoclassical synthesis. Post-Keynesian economics emphasizes uncertainty, endogenous money, and the roles of financial institutions (*Braga & Serrano,* 2023a).

A core principle is the focus on uncertainty and the unpredictable future, challenging classical and neoclassical ideas of rational expectations. Post-Keynesians argue that uncertainty requires active government interference to alleviate the economy and guard against fluctuations (*King,* 2022).

In terms of theoretical models, Post-Keynesian economists critique the traditional money supply function and propose an endogenous money supply model. Unlike the exogenous view where the central bank controls the money supply M, Post-Keynesians argue that M is determined by the demand for loans (credit) and is therefore endogenous:

$$\mathrm{M} = \mathrm{D}(\mathrm{Y}, \mathrm{r}) \tag{5}$$

where D is the demand for loans or credit which depends on income Y and the interest rate r. This view emphasizes banks' role in creating money through lending, challenging traditional monetary policy mechanisms. It suggests the central bank adjusts the money supply to meet credit demand at its target interest rate, indicating a demand-driven money supply.

Post-Keynesians share core principles but differ in focus. Davidson highlighted Keynes's emphasis on uncertainty, the link between price elasticity and employment, and money's non-neutrality. Uncertainty hinders predicting the future from the past. Gross substitution fails, so price elasticity doesn't guarantee full employment. Money impacts output and jobs. Davidson supports Keynes's call for active fiscal, monetary, and income policies when demand declines (*King,* 2013).

Let Y be total income; C be consumption (the suffixes w and p refer to consumption expenditure by workers and capitalists); I be investment; W be wages;

and P be total profit. In the simplest case, when there is no government or foreign sector, Expenditure = $C + I = C_w + C_p + I$, and Income = $W + P$.

Assuming that workers do not save, so $C_w = W$, the Equivalence of income and expenditure means that $P = C_p + I$; thus, overall, profit is determined by the expenditure of capitalists.

Total profit now equals capitalists' expenditure plus the budget deficit. Further, let us introduce an open economy, which means that exports X are added to total expenditure and imports M to total income. It is easy to show that:

$$\mathrm{P} = (\mathrm{Cp} + \mathrm{I}) + (\mathrm{G} - \mathrm{T}) + (\mathrm{X} - \mathrm{M}) \tag{6}$$

Therefore, aggregate profit is a function of capital expenditure plus budget deficit plus trade surplus. According to Kalecki, business cycles depend on investment fluctuations, but underutilization can also result from income distribution leading to insufficient consumption (*Basile & Salvadori,* 1984).

Minsky's (1992) contributions enriched Post-Keynesian economics with his Financial Instability Hypothesis, explaining how financial markets can cause economic instability. He highlighted the cyclical nature of financial systems, where stability leads to excessive optimism, increased borrowing, and risk-taking, eventually causing financial crises.

Minsky's model categorizes financial behavior into Hedge Finance (repayment via cash flows), Speculative Finance (interest payments met, principal requires refinancing), and Ponzi Finance (reliance on asset appreciation for debt servicing). This framework underscores the importance of financial regulation and government intervention for macroeconomic stability.

Another key principle of Post-Keynesian economics is reflected in Kalecki's pricing model, which ties income distribution to pricing and investment decisions:

$$\mathrm{P} = \frac{\mathrm{W}}{1-\mathrm{k}} \tag{7}$$

where P is the price level, W is the wage cost per unit of output, and k is the markup rate over unit labor costs. Firms set prices by adding a markup over their costs, influenced by their monopoly power. This highlights the role of market structures and income distribution in macroeconomic outcomes, differing from classical models that assume perfect competition and flexible prices.

Despite theoretical value, Post-Keynesian economics is underrepresented in policy. Its views on monetary policy during instability and uncertainty, plus endogenous money, challenge central banking but are misunderstood. Its implications for crises and inequality are not integrated into policy debates.

New-Keynesian Economics

New-Keynesian economics emerged in response to New Classical economics, which emphasized rational expectations and efficient markets, minimizing policy intervention. New-Keynesians integrated rational expectations with market imperfections like sticky prices and wages to explain persistent unemployment and inflation. Key figures like Mankiw, Fischer, and Blanchard merged micro foundations with Keynesian insights (*Gordon,* 1990).

New-Keynesian economics emphasizes price and wage stickiness. Unlike New Classical models with instant adjustments, New-Keynesians acknowledge that slow adjustments due to factors like contracts and information issues. This stickiness allows demand shifts to impact output and employment, justifying stabilization policies. (*Taylor,* 1999). A fundamental equation in New-Keynesian models is the New-Keynesian Phillips Curve (NKPC), which describes the relationship between inflation and economic activity:

$$\pi_t = \beta E_t \pi_{t+1} + \kappa y_t^{gap} \tag{8}$$

where π_t is the rate of inflation at time (*t*), $E_t\pi_{t+1}$ is the expected inflation at the time (*t + 1*) based on information available at the time (*t*), β is the discount factor, κ reflects the degree of price stickiness and how inflation responds to the output gap, y_t^{gap} is the output gap (the difference between actual output and potential output). This equation implies that current inflation depends on expected future inflation and the current output gap, highlighting the roles of expectations and real economic activity in the inflation process. It incorporates rational expectations while acknowledging that due to price stickiness, markets do not always clear instantly.

New-Keynesians emphasize market imperfections like monopolistic competition, where firms set prices. This contrasts with perfect competition and explains how demand shifts affect output and employment through firms' production and pricing adjustments (*Taylor,* 1999).

New-Keynesians incorporate rational expectations but acknowledge market imperfections and information asymmetry can cause suboptimal outcomes like persistent unemployment or inflation. This justifies active policy interventions to correct market breakdowns and stabilize the economy (*Gordon,* 1990).

In their modeling approach, New-Keynesians often utilize the Dynamic Stochastic General Equilibrium (DSGE) framework, which provides micro-foundations for macroeconomic analysis. Within this framework, the behavior of consumers and firms is derived from optimization problems. For instance, the representative household maximizes utility over consumption C_t and labor supply N_t, leading to an Euler equation for consumption:

$$C_t^{-\sigma} = \beta E_t\{C_{t+1}^{-\sigma}(1 + r_{t+1})\} \tag{9}$$

where σ is the coefficient of relative risk aversion, β is the discount factor, r_{t+1} is the real interest rate. This equation captures the intertemporal choice of consumption, linking present and future consumption decisions to interest rates and expectations. In terms of monetary policy, the Taylor Rule is a policy guideline that suggests how central banks should set nominal interest rates in response to deviations of inflation and output from their targets:

$$i_t = r^* + \pi_t + \phi_\pi(\pi_t - \pi^*) + \phi_y(Y_t - Y^*) \tag{10}$$

where i_t is the nominal interest rate, $r^*$is the equilibrium real interest rate, π_t is the current inflation rate, π^* is the target inflation rate, y_t is the logarithm of actual output, y^* is the logarithm of potential output, ϕ_π and $\phi_y$are the parameters indicating how strongly the central bank responds to deviations in inflation and output. These models embody how monetary policy can stabilize the economy by influencing expectations and responding systematically to economic fluctuations. They acknowledge that due to price stickiness, such policy interventions can have real effects on output and employment.

New-Keynesian models, though central to central banks, face criticisms. Rational expectations and representative agents may oversimplify economic diversity and financial markets, hindering crisis understanding. Price/wage stickiness as the primary imperfection may also oversimplify real-world frictions (*Caballero,* 2010). These aspects suggest New-Keynesian models might not fully capture dynamics during economic turbulence, which this paper aims to investigate further.

Much of the existing literature focuses on the theoretical distinctions between Post-Keynesian and New-Keynesian frameworks without fully exploring their empirical applications in recent crises. While studies have examined the effectiveness of New-Keynesian policies in inflation targeting regimes (*Beck & Wieland*, 2009) and Post-Keynesian approaches in managing financial instability (*Fontana & Palacio-Vera*, 2007), few have directly compared how these paradigms influence central bank decision-making during crises such as the 2008 Global Financial Crisis, the Eurozone crisis, and the COVID-19 pandemic.

CORE CONCEPTS OF MONETARY POLICY

Interest Rates and Inflation

The connection between interest rates, inflation, and the economy is crucial for monetary policy and is viewed differently by Keynesian, Post-Keynesian, and New-Keynesian economics. Each provides a distinct perspective on monetary policy dynamics and their impact on economic stability and growth (*Rochon,* 2007).

Keynesian economics uses interest rates to influence aggregate demand. Lower rates reduce borrowing costs, boosting investment and spending, while higher rates increase costs, slowing economic activity. Inflation is seen as a result of excessive demand, so managing interest rates and inflation involves adjusting demand to sustainable levels without causing excessive inflation (*Coibion et al.,* 2010).

Post-Keynesians challenge the monetarist view, believing inflation originates in the real economy, especially in labor and raw materials markets. They oppose independent monetary policy institutions, arguing high interest rates harm the economy and increase unemployment. They emphasize macro-prudential supervision to prevent crises, a practice adopted after the 2008 crisis, changing oversight of major financial players in the US and EU (*King,* 2013).

Post-Keynesians emphasize uncertainty and endogenous money in the interest rate-inflation-economy relationship. Central banks influence interest rates indirectly, as money supply responds to loan demand. They stress sectoral monetary policy impacts and cost-push inflation (wages, commodities) over demand-pull, advocating a wider policy approach (*Bastian et al.,* 2024).

New-Keynesian economics combines Keynesian thought with rational expectations and micro-foundations, explaining how interest rates affect the economy through expectations and market imperfections. Nominal rigidities (e.g., sticky prices/wages) cause output and employment fluctuations from monetary policy. Central banks manage inflation and activity by adjusting interest rates to guide inflation expectations, highlighting the importance of clear communication and credibility (*Salimi et al.,* 2025). New-Keynesians often favor inflation targeting, where interest rates maintain inflation within a range. (*Ball et al.,* 1988).

Central Banking and Monetary Supply

Post-Keynesian and New-Keynesian perspectives diverge on central banking's role in monetary policy (*Rochon & Rossi,* 2007). Post-Keynesians argue against direct money supply control, emphasizing its endogeneity driven by loan demand and bank lending (*Kriesler,* 2011). They see central banks as influencing the economy through interest rate policy, prioritizing credit conditions, financial stability, and addressing financial crises (*Rochon & Rossi,* 2007). New-Keynesians highlight central banks' influence through interest rate adjustments and expectation management, leveraging rational expectations to impact economic activity (*Beck & Wieland,* 2009). Additionally, they support inflation targeting as a crucial monetary policy to anchor expectations and stabilize prices (*Piazzesi et al.,* 2019).

Endogenous and Exogenous Money

Post-Keynesian economics focuses on endogenous money, where the banking system's response to loan demand controls the money supply. Banks create new money when issuing loans, driven by credit demand and economic conditions (*Tily,* 2007b).

Post-Keynesians believe central banks influence the money supply through interest rates, affecting borrowing costs and loan demand. This makes the money supply a bottom-up process based on the economy's needs. They emphasize credit dynamics and challenge monetarist inflation control via money supply (*Rochon & Rossi,* 2013). They link inflation to cost factors, not monetary aggregates.

Conversely, New-Keynesians see money supply as exogenous, controlled by central banks via policy tools like open market operations (*Chung et al.,* 2015). While acknowledging bank lending's role, they emphasize central bank influence through monetary policy and regulation, viewing the central bank as actively managing both money supply and demand (*Desai,* 1989).

Policy Tools and Effectiveness

Post-Keynesians advocate for a broader monetary policy than interest rate adjustments, emphasizing the interconnectedness of money, banking, and financial stability (*Kriesler,* 2011). They support stricter bank regulations and targeted credit controls, alongside quantitative measures and direct lending, especially during financial instability (*Pressman,* 2011).

New-Keynesians, focusing on market imperfections and expectations, primarily utilize interest rates and forward guidance to influence inflation, output, and employment. Inflation targeting is a core strategy for anchoring expectations and promoting price stability (*Chung et al.,* 2015).

COMPARATIVE ANALYSIS

Post-Keynesian and New-Keynesian monetary policy approaches differ significantly in theory, assumptions, and implications for economic management, stemming from their contrasting views on economic systems, central banking, and monetary policy's impact (*Table 1*).

Table 1: Post-Keynesian vs. New Keynesian Monetary Policy: Key Differences

Feature	Post-Keynesian View	New-Keynesian View
Role of Government	Strong state intervention in markets	Limited government role; markets self-correct
Inflation Control	Cost-push factors (e.g., wages, supply chains)	Demand-side focus (monetary policy adjustments)
Monetary Policy	Credit regulation, direct interventions	Interest rate targeting, inflation expectations
Crisis Response	Coordination of fiscal and monetary policy	Independent central bank action
Money Supply	Endogenous (credit-driven)	Exogenous (controlled by central bank)
Policy Flexibility	Adaptive to economic conditions	Rule-based monetary frameworks
Empirical Application	Advocates unconventional tools (e.g., MMT, fiscal dominance)	Prefers conventional central bank-led approaches

Contrasting Key Concepts and Assumptions

Post-Keynesians challenge conventional views on money supply and economic stability. They emphasize endogenous money, where the banking system determines the money supply based on credit demand, while contrasting with the traditional exogenous view. They highlight inherent uncertainty and financial instability in capitalist economies, viewing crises as inherent. They stress the importance of income distribution in shaping economic outcomes, arguing that it significantly influences aggregate demand and stability. This perspective provides insights into the structural factors affecting economic activity and wealth distribution (*Pressman,* 2011).

New-Keynesian economics combines microeconomic foundations with macroeconomic phenomena, emphasizing rational expectations and their influence on collective behavior. Price/wage stickiness causes short-term deviations from full employment following economic shocks (*Melmies,* 2010). However, New-Keynesians believe monetary policy, through interest rate adjustments and expectation management, effectively mitigates these shocks and promotes stability (*Chung et al.,* 2015).

Implications for Monetary Policy

Post-Keynesians advocate for a broader role for central banks, extending beyond conventional mandates to include direct credit regulation and financial stability measures (*Bibow,* 1998). They are skeptical of interest rate policies in the past, emphasizing the link between endogenous money and financial uncertainty. They argue for direct financial market interventions to address structural issues. Post-Keynesians believe monetary policy alone cannot resolve economic instability. They stress the importance of structural reforms, such as reducing income inequality, to complement monetary interventions. This approach reflects a detailed understanding of economic challenges, necessitating comprehensive policies for sustainable growth and stability (*Hein & Lavoie,* 2019).

New-Keynesian monetary policy emphasizes clear objectives, effective communication, and inflation targeting to steady expectations and promote stability. Providing credible and forward-looking information is crucial. While traditional interest rate policy is fundamental, unconventional tools are also valued, demonstrating adaptability (*Castelnuovo & Pellegrino,* 2018). The following section analyzes Post-Keynesian and New-Keynesian responses to the 2007–2008 financial crisis and the 2010 European debt crisis to illustrate these theoretical differences in practice.

Global Financial Crisis of 2007–2008

Post-Keynesians attribute the worldwide financial crisis to financial instability and endogenous money creation, fueling extreme lending and asset bubbles. They contend that adjusting interest rates alone could not have averted the crisis, underscoring the limitations of conventional monetary policy. In response, they call for stricter financial regulation and direct lending controls. They emphasize central banks preventing systemic failure by acting as lenders of last resort and advocate coordinated fiscal policies to stimulate demand, recognizing the interplay of monetary and fiscal measures (*Keen,* 2013).

New-Keynesians attribute the global financial crisis partly to irrational optimism and misaligned expectations, highlighting the limitations of traditional monetary policy at the zero lower bound. They advocate for unconventional monetary tools and forward guidance to manage expectations during such crises. (*Galí,* 2018).

European Sovereign Debt Crisis

Both Post-Keynesians and New-Keynesians offer insightful interpretations of the European sovereign debt crisis and offer suggestions for resolving its primary causes. Post-Keynesians attribute the European sovereign debt crisis to Eurozone structural imbalances (e.g., trade disparities, lack of fiscal union) exacerbated by unified monetary policy without fiscal coordination (*Tirole,* 2012).

New-Keynesians emphasize the role of expectations, particularly sovereign debt concerns and contagion risk, criticizing the Eurozone's inadequate crisis framework. Post-Keynesian solutions include debt restructuring and fiscal integration, while New-Keynesians advocate for ECB interventions and credible communication to manage expectations (*Galí,* 2018).

Recession

Post-Keynesians support straight government intervention and fiscal stimulus during recessions, prioritizing public spending and tax cuts to boost demand and employment alongside financial stability measures (*Stockhammer,* 2022).

New-Keynesians, on the other hand, favor combined monetary and fiscal policies, highlighting interest rate reductions to stimulate investment and consumption (*Galí,* 2018).

Inflation

Post-Keynesians address inflation via cost-push features (e.g., wages, raw materials), advocating targeted interventions and income policies to manage expectations and avoid contractionary monetary policy (*Braga & Serrano,* 2023 b). New-Keynesians prioritize inflation targeting, relying on central bank credibility and interest rate adjustments to maintain price stability, supplemented by forward guidance (*Coibion et al.,* 2010).

Economic Growth

Post-Keynesians emphasize long-term growth via structural improvements, investments, and income equality policies, arguing that equitable wealth distribution boosts aggregate demand (*Kriesler,* 2011). They prioritize financing productive investments through targeted credit policies.

New-Keynesian economists highlight the significance of monetary policy in promoting economic growth. They aim to keep inflation low and steady by regulating interest rates and targeting inflation. Furthermore, they suggest improving market efficiency and reducing imperfections through regulatory reforms and policies that encourage competition and innovation (*Trautwein,* 2020).

Empirical Evidence

To evaluate the practical applicability of Post-Keynesian principles and New-Keynesian monetary policy tools, it is crucial to examine empirical studies assessing their effectiveness. This analysis provides insights into how these theoretical approaches perform in real-world central banking scenarios, highlighting their strengths and limitations.

In the 1990s, most large central banks, including the Federal Reserve, adopted an inflation-targeting regime, shifting the focus from monetary aggregates to inflation targeting, in line with New-Keynesian theory. The European Central Bank also adopted this regime, aiming to achieve the inflation target primarily through interest rate changes. These changes were implemented in a rule-based manner, based on the output gap, which is the difference between potential and actual output (*Beck & Wieland,* 2009).

Major central banks like the FED and ECB began using neo-Keynesian models for monetary policy in the early 2000s, with DSGE models becoming standard. These models were tailored to specific economies, emphasizing accurate parameter estimates.

After the 2008 crisis, the zero lower bound limited central banks' scope. With rates at zero, they influenced economic agents through expectations, ensuring transparency and forward-looking communication. This required discretionary tools inspired by Keynesian thinking. Asset purchases influenced the yield curve, and the roles of liquidity provision and lender of last resort became prominent from 2010 to 2020 and during the COVID crisis (*Szabó-Bakos,* 2007).

A comparative analysis of policy responses during the 2008 Global Financial Crisis (GFC), the Eurozone crisis, and the COVID-19 pandemic reveals the differing applications of Post-Keynesian and New-Keynesian paradigms in real-world policymaking. During the 2008 GFC, the FED implemented multiple rounds of quantitative easing (QE), expanding its balance sheet from approximately $900 billion in 2008 to over $4 trillion by 2014. This approach aligned with New-Keynesian principles of managing expectations and influencing long-term interest rates. The ECB, however, initially resisted QE due to concerns over moral hazard and fiscal discipline but later introduced the Securities Market Programme (SMP) and Outright Monetary Transactions (OMT) to stabilize financial markets. Post-Keynesians criticized these delayed interventions, arguing that stronger fiscal-monetary coordination could have mitigated the downturn more effectively (*Taylor,* 2009).

During the Eurozone crisis, the ECB's monetary policy was constrained by the Eurozone's structural limitations, leading to austerity-driven responses that deepened economic contractions in several member states. Post-Keynesians argue that the ECB's strict focus on price stability prolonged the crisis, while a more flexible approach, involving direct central bank financing, could have supported recovery. In contrast, the FED continued its expansionary policies, further highlighting the divergence in theoretical applications(*Taylor,* 2009).

The COVID-19 pandemic tested these monetary frameworks once again. Both the FED and ECB launched large-scale asset purchase programs and liquidity measures, but their strategies reflected distinct theoretical influences. The FED responded with rapid fiscal-monetary coordination, while the ECB faced internal debates over debt mutualization. Post-Keynesian critiques highlight the necessity of stronger fiscal coordination within the Eurozone, whereas New-Keynesians emphasize the importance of maintaining central bank independence and inflation control.

Empirical Evidence from Post-Keynesian Approaches

Post-Keynesian monetary policies have been used to address financial instability and promote sustainable growth, focusing on credit controls, financial regulations, and fiscal interventions.

Japan's post-war growth benefited from direct credit controls by the Bank of Japan, aligning with Post-Keynesian emphasis on endogenous money and strategic credit allocation (*Werner,* 2005). Similarly, Malaysia's response to the 1997 Asian Financial Crisis involved capital controls and financial regulations, aiding faster recovery compared to traditional policies (*Epstein & Yeldan,* 2009).

However, the effectiveness of Post-Keynesian policies depends on the institutional and economic context. For example, in the European Monetary Union, the lack of fiscal integration and the ECB's focus on price stability limit the application of these policies (*Fontana & Palacio-Vera,* 2007).

Empirical Evidence from New-Keynesian Approaches

New-Keynesian monetary policies, such as inflation targeting and interest rate adjustments, are widely used by central banks globally. Empirical studies have assessed their effectiveness in achieving macroeconomic stability.

Bernanke et al. (1999) found that inflation targeting in countries like New Zealand, Canada, and the UK reduced inflation rates, anchored expectations, and supported macroeconomic stability without harming output growth. This supports the New-Keynesian view that clear policy frameworks and credibility enhance monetary policy effectiveness.

During the Global Financial Crisis, studies examined unconventional monetary policies like quantitative easing (QE). *Joyce et al.* (2012) found that the Bank of England's QE program lowered long-term interest rates and supported asset prices, stabilizing the financial system and promoting recovery. This aligns with the New-Keynesian emphasis on managing expectations and using various tools when conventional policies are limited.

However, some studies highlight limitations. *Blinder et al.* (2017) noted that while QE had positive effects, its impact on stimulating real economic activity was less than expected, suggesting diminishing returns and raising concerns about long-term reliance on unconventional tools. The divergence in how the FED and ECB responded to the COVID-19 crisis further underscores the importance of integrating insights from both monetary paradigms to develop more effective crisis management strategies.

Critiques and Limitations

While both Post-Keynesian and New-Keynesian approaches offer valuable insights, they also face criticisms and have limitations that need to be acknowledged to provide a balanced view.

Critiques of Post-Keynesian Approach

Critics argue that the Post-Keynesian focus on endogenous money and financial regulation may underestimate the challenges of implementing policies in globalized financial systems. The lack of a unified framework complicates precise policy recommendations (*Bonizzi & Kaltenbrunner,* 2020).

Opponents also highlight that heavy reliance on government intervention can cause inefficiencies and market distortions and question the effectiveness of direct credit controls in liberalized markets (*Palley,* 2013).

Empirical critiques point to mixed results of Post-Keynesian policies, such as capital flight from stringent regulations without international coordination and the varied success of credit controls in developing countries (*Arestis & Sawyer,* 2006).

Critiques of New-Keynesian Approach

The New-Keynesian framework faces criticism for relying on rational expectations and representative agent models, which may not capture real-world behaviors like agent heterogeneity and irrational decision-making (*Caballero,* 2010).

Critics argue that price and wage stickiness oversimplify market dynamics, leading to potentially ineffective policies. For example, *Taylor* (1999) questioned the impact of low interest rates during liquidity traps.

The Global Financial Crisis revealed limitations in the New-Keynesian focus on price stability, as economies with low inflation still faced severe crises, suggesting an underestimation of financial factors and systemic risks (*Blanchard et al.,* 2010).

Additionally, prolonged use of unconventional monetary policies like QE has raised concerns about asset bubbles, income inequality, and challenges in unwinding central bank balance sheets without market disruption (*Rogers et al.,* 2014).

CONCLUSION

This comparative investigation of Post-Keynesian and New-Keynesian monetary policy shows critical distinctions with implications for current economic challenges. Post-Keynesians prioritize financial instability, endogenous money, and income distribution, while New-Keynesians emphasize rational expectations, price/wage stickiness, and interest rate/inflation targeting efficacy. These theoretical divergences yield varied policy recommendations, particularly regarding financial crises, inflation, growth, and distribution.

In today's complex financial landscape, understanding these perspectives is crucial. Recognizing individual theoretical limitations enables policymakers to develop more comprehensive monetary policies. The 2007–2008 crisis and subsequent sovereign debt crisis demonstrated the shortcomings of solely relying on traditional New-Keynesian approaches, highlighting the necessity for incorporating Post-Keynesian understandings on financial instability and income distribution. More recently, the post-2021 inflationary period has challenged the effectiveness of conventional monetary policy, raising concerns about how to manage inflation dynamics amid global supply disruptions and structural economic changes. Addressing these challenges requires a broader policy perspective that integrates supply-side factors, global value chain disruptions, and income distribution effects—elements that pose challenges to both New-Keynesian and Post-Keynesian frameworks.

From a policy perspective, different macroeconomic conditions call for different theoretical approaches. In times of financial instability and economic downturns, Post-Keynesian tools—such as active fiscal-monetary coordination and direct credit regulation—can play a vital role in stabilizing the economy. Conversely, in more stable economic environments, New-Keynesian policies—such as rule-based monetary frameworks and inflation targeting—are well-suited for maintaining long-term price stability and anchoring expectations. Rather than viewing these paradigms as mutually exclusive, policymakers should consider an integrated approach that balances demand management, financial stability, and inflation control. A more pragmatic and flexible policy framework, drawing from both traditions, would allow central banks and governments to respond more effectively to evolving economic challenges, including climate finance, fintech innovations, and digital currency adoption.

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IMPACT OF MACROECONOMIC INDICATORS ON SUBJECTIVE SATISFACTION

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ABSTRACT

Several analyses have already shown that subjective satisfaction levels are closely correlated with economic performance, and therefore there is a growing focus for governments to monitor the level of satisfaction in society. In our study, we investigate the relationship between subjective satisfaction and financial market variables using macroeconomic data for European countries over the period 2013–2022. From a financial perspective, the savings and loans of the population are a very significant share of the financial sector, which is influenced by both market and governmental factors. In our analysis we include demographic, economic and financial market variables. We find that increases in the ratio of savings to household credit are positively correlated with subjective satisfaction, while changes in the central bank base rate have a negative impact on household satisfaction.
Keywords: happiness, satisfaction, savings, central bank interest rate
JEL codes: G51, G530

INTRODUCTION

The measurement of subjective satisfaction and research into its determinants have become increasingly important in recent years. Satisfaction as a measurable subjective factor is identified and used in the literature with the concept of happiness (*Helliwell et al.*, 2022), the development of which is influenced by a number of factors. In an economic approach, money, income and wealth are central among the determinants. Following the financial indicators of individual European countries, we see very significant differences in household savings and credit, for a number of reasons. These may include differences in levels of development, economic performance, wealth structure, income levels, or even the different structure of public finance systems. However, the undisputed goal of individuals and households is to achieve happiness and financial well-being. At the level of the national economy, a significant part of the population's income is saved for later use. The lack of financial awareness and knowledge necessary to use financial products safely may firstly reduce the financial resources and wealth of individuals and, indirectly, the savings of the economy, thus affecting financial stability at both micro and macro levels. On this basis, we have therefore formulated the question of what impact the development of macroeconomic financial indicators has on subjective satisfaction.

The relationship between money and happiness has been central to the analysis of many happiness researchers. However, there are many ways of interpreting money as an economic instrument, such as money supply, money quantity, but of course most researchers approach the issue from the household side, considering income and/or wealth as the financial variable that influences subjective satisfaction. In the literature on the subject, *Easterlin* (1974) found a strong positive relationship between income and happiness, as did *Clark* (2011) and *Diener & Biswas-Diener* (2002). Analysing data from the 1990s, *Di Tella & MacCulloch* similarly found a positive correlation between happiness and income, welfare state and (poor) life expectancy among the population of OECD countries, but a negative correlation with average hours worked, environmental degradation, crime, openness to trade, inflation and unemployment.

Easterlin's later work further elaborated on his earlier results. He concluded that individuals compare their income with the income of other people. People with higher incomes may then feel happier. If they find that the increase in other people's incomes may be higher than their own, their feelings of happiness are negatively affected. In such cases, they consider relative growth rather than absolute wealth. It is found that, although happiness and income show a strong positive relationship in the short run, over time happiness does not increase in proportion to income growth. This is called the Eastrelin paradox. (*Easterlin & O'Connor,* 2021)

Kahneman & Deaton (2010) found that having more money does not necessarily buy more happiness, but having less money also brings emotional pain. They argue that above a certain income level, the increase in income alone does not lead to greater happiness, but rather to an increasing role for certain social factors such as being with loved ones, leisure, etc. A similar finding was made by Takács (2005), who analysed data from Hungary and concluded that, yes, ultimately money makes people happy, but only up to a certain level *Takács*, 2005 and *Parádi-Dolgos & Bareith* 2022 found a non-linear relationship between income growth and happiness.

Several studies have also shown that although wealth growth increases happiness, the rate of increase is not very large and that there is a positive relationship between wealth and happiness, while there is a negative relationship between debt and happiness (*Jantsch & Veenhoven,* 2019).

Guven (2012), in an analysis of Dutch households, showed that people who are happier save more and spend less, and have a lower propensity to consume. Happier people spend more time making decisions and have more control over their spending. They expect to live longer and are therefore more concerned about the future than the present, with low inflation expectations.

Cryder et al. (2008) found in their research that emotional state and short-term financial decisions are strongly correlated. *Clark et al.* (2008) demonstrated a positive independent effect of subjective confidence on risky financial investments and insurance products. However, the results also indicate that happier individuals are less likely to invest in these assets. This novel finding is consistent with the mood maintenance hypothesis, which posits that individuals in good moods are reluctant to gamble, for example, because they do not want to undermine their sense of happiness. Thus, these individuals are relatively more risk averse. It is noteworthy that the negative economic impact of investing in risky financial products and insurance is stronger than the positive impact of safe low-risk products.

In *Mimura's* 2023 survey, the correlation between happiness and savings was examined using data from Japanese households in 2018 and 2019. He found that savings in the previous year were not associated with higher happiness levels one year later, but higher happiness levels one year later were associated with higher savings and investment (*Mimura*, 2023). *Liu et al.* (2019) empirical results from Chinese households showed that total household debt significantly reduces family happiness, and the effect of different types of debt on happiness is heterogeneous. Different sources of housing loans have different effects on happiness, and only non-bank loans significantly reduce people's happiness.

In their book *Frey & Stutzer* (2002) examined the relationship between happiness and economics and happiness and democracy in Switzerland. They found that income increased happiness only slightly, while democratic institutions and autonomy increased it more. Inflation and unemployment reduce happiness (*Frey & Stutzer*, 2002).

In his 2013 paper, Easterlin examined growth in countries with different levels of economic development in relation to happiness in the long and short term. He concluded that economic growth does not cause happiness growth. In some cases, such as China, short-term happiness growth has not been demonstrated (*Easterlin*, 2013).

However, more recent research is now concluding that happiness is increasingly influenced by a variety of social factors, personal relationships, mental state, political issues, etc., in addition to economic and income factors (*Layard*, 2005; *Diener & Seligman*, 2004; *Helliwell & Putnam*, 2004).

MATERIALS AND METHODS

In our analysis we looked at the relationship between subjective satisfaction and savings. To do this, we included variables based on the literature and economic context. Our dependent variable was the happiness index published by the United Nations in the World Happiness Report. As an independent variable we collected data that have a significant impact on the financial and economic situation of a country. The net wealth of the population plays a significant role in maintaining the stability of the financial system, and so the stock of savings and loans was included as our variable. Both of these indicators are significantly affected by the level of the base rate of the central bank of the country in question, and have thus been added to our database. We have then collected variables that may be related to these data (inflation, consumption, GDP), as well as indicators on population (population density, unemployment, birth and death rates), development (HDI, education expenditure) and income (Gini Index). These data are correlated, so our results are only meaningful for developed countries.

For the analysis, the data were collected in a panel database, on which regression analysis was performed using the random effect method. We included 40 European countries in the study, for which we collected data from the period 2013–2022.

The study started by constructing a regression model with all variables included together. The results are presented in *Table 1*. During the analysis, we found that some variables showed an opposite relationship to our expectations, and there were also variables that did not yield a significant relationship. We therefore decided to group the variables into groups and thus construct different regression models. The variables were finally sorted into 3 groups: demographic variables, economic factors and financial indicators. Regression analysis was also performed for each group separately. In the present analysis, we assumed a linear relationship between these variables. In the future we would like to extend this with a logarithm model.

Calculations were performed using STATA version 17 software.

RESULTS AND DISCUSSION

The results of regression analysis to explore the determinants of happiness are presented in *Table 1*.

Table 1: Relationship between factors affecting subjective satisfaction

Variables		**Demographic variables**	**Economic variables**	**Financial variables**
	Coefficients	**P-value**	**P-value**	**P-value**
HDI	12.11389	0.000		
Female unemployment	-0.0513242	0.003		
rate				
Male unemployment rate	0.0592987	0.004		
Population density				
Life expectancy at birth	0.0002572	0.024		
for women	-0.0235407	0.436		
Life expectancy at birth				
for male	0.0258687	0.235		
Mortality rate				
Fertility rate	0.0364793	0.049		
Education expenditure	0.6014822	0.000		
	-0.0335093	0.278		
GINI Index	-0.0408373		0.000	
GDP per capita	0.00000966		0.009	
Household consumption	-0.0011153		0.896	
HICP				
EU membership	0.0071163		0.676	
	-0.1832671		0.095	
Household savings stock	0.0013237			0.876
Bank base rate				
Stock of loans to	0.0486692			0.021
households	0.0033361			0.003

In the analysis, we found that we obtained non-significant results for variables for which we expected a closer relationship. Of these, the stock of savings was the most surprising, as we had assumed a positive relationship. People who have some savings are less stressed about the future, feel more secure about their financial situation and are therefore happier. The education expenditure variable showed an opposite non-significant relationship with our expectations. Here, we hypothesised that people in countries with higher spending on education would have higher educational attainment, better working conditions, higher wages and thus be happier. The relationship between household consumption and happiness also yielded some surprising results. We hypothesised that higher consumption means higher need satisfaction for people, and thus a higher sense of happiness. In contrast, the result showed that there is no relationship between the two variables. Life expectancy at birth did not show a significant relationship for either sex. However, the mortality rate and fertility rate showed significant positive results. There are important economic considerations behind these. In the case of higher mortality rates, this means that there will be a lower proportion of retired people, which will put less strain on the pension system. And in the case of a rising fertility rate, if more children are born, there will be a higher share of the active population, which can improve economic performance.

As a first sub-analysis, demographic factors were examined in relation to the happiness index (R^2=0.7725). No significant results were obtained for the male unemployment rate (p=0.702) and population density (p=0.179), nor for the death rate (p=0.606). Significant and positive directional relationships were found with HDI (p=0.000), male life expectancy at birth (p=0.000), fertility rate (p=0.000) and education expenditure (p=0.000). Significant and negative directional relationships were found with female unemployment rate (p=0.001) and female life expectancy at birth (p=0.001). The results are presented in *Table 2*.

Table 2: Relationship between happiness and demographic factors

Variables	Coefficients	P-value
HDI	8.4580	0.000
Female unemployment rate	-0.0480	0.001
Male unemployment rate	0.0065	0.702
Population density	-0.0001	0.179
Life expectancy at birth for women	-0.0767	0.001
Male life expectancy at birth	0.0942	0.000
Mortality rate	0.0066	0.606
Fertility rate	0.5333	0.000
Education expenditure	0.0713	0.000

Looking at unemployment, no significant correlation was found for men, while a negative effect was found for women. Looking at life expectancy at birth by gender, we also found a negative correlation for women. Unsurprisingly, in countries where the HDI (Human Development Index) is higher, this also has a positive effect on the happiness of the population. In this case, we have shown that increased spending on education also increases happiness.

In the next part of the analysis, economic factors were examined (R2=0.6791). Consumption (p=0.804) and HICP (p=0.635) did not show a significant correlation with happiness. A significant positive relationship was found for GDP per capita (p=0.000), although the effect was very small. A significant negative relationship was found for EU membership (p=0.041) and the GINI Index (p=0.000). The results are presented in *Table 3*.

Table 3: The relationship between happiness and economic factors

Variables	Coefficients	P-value
GINI Index	-0.0824	0.000
GDP per capita	0.0000	0.000
Household consumption	-0.0015	0.804
HICP	0.0076	0.635
EU membership	-0.1901	0.041

As in the original model, consumption is not significant, so we concluded that there is no correlation between happiness and consumption over this 10-year period for the countries we studied. The same conclusion can be drawn for the Harmonised Index of Consumer Prices (HICP). The GINI Index measures income inequality, which we have shown to have a negative relationship with happiness, i.e., if income inequality increases in a country, people's happiness and satisfaction decreases. The level of GDP per capita increases subjective satisfaction, but only to a very small extent.

We concluded the analysis by examining the financial indicators (R2=0.4756). All variables included in the analysis showed significant results (p=0.000), with savings and credit showing a positive relationship and the central bank base rate showing a negative relationship. In this category, further extension of the set of variables included is needed. The results are presented in *Table 4*.

Table 4: Relationship between happiness and financial factors

Variables	Coefficients	P-value
Household savings stock	0.0541	0.000
Bank base rate	-0.0389	0.000
Stock of loans to households	0.0097	0.000

In the analysis of financial indicators, we examined the evolution of the base rate of the central bank in the same year with the savings and loans position in the same year. Taking into account the lag effect would presumably show a different result. We intend to investigate this in a later stage. The household savings stock is positively correlated with happiness, i.e., if one's savings increase, one feels more secure about the future, both in terms of contingencies and long-term security, and is less stressed about one's financial situation, and therefore happier. There is also a positive correlation for credit. This is explained by the fact that the increase in credit is driven by an increase in certain assets (e.g. property, car, etc.), which also leads to an increase in the feeling of security and therefore an increase in happiness for the population. In the case of the base rate of the central bank, a negative correlation was found, i.e., an increase in the base rate leads to a decrease in the feeling of happiness.

CONCLUSIONS

As we have seen in many literatures, we have identified subjective satisfaction with happiness. Based on their results, we concluded that household savings and credit have a positive effect on happiness. An increasing savings stock is consistent with previous analyses, i.e., it increases satisfaction, the sense of security and leads to positive macroeconomic effects. Likewise, this positive effect is also observed through the increase in wealth that can be achieved through credit. However, a negative relationship was found with the base rate of the central bank. The evolution of the central bank base rate has a double dimension. As we have seen in recent years in Hungary, an increase in the base rate of the central bank encourages the population to turn to safer forms of savings (e.g. government bonds). However, it has a negative impact on borrowing due to higher interest rates, which may lead to a postponement of investments and renovations.

As a further step, it may be worthwhile to investigate what correlations can be identified for the financial variables when the lagged effect is taken into account. We also want to overcome the limitation of assuming a linear relationship.

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Ministry of Culture and Innovation

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ANALYSING THE DETERMINANTS OF YOUTH UNEMPLOYMENT IN TRANSITIONAL ECONOMIES EVIDENCE FROM HUNGARY

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ABSTRACT

Youth unemployment in Europe poses a serious challenge to the European Union and its member states. The main objective of the study was to investigate the macroeconomic determinants of youth unemployment in Hungary using the Autoregressive Distributed Lag (ARDL) model. To achieve the objective of the study, secondary data was used, which was collected from the World Bank for the period 1992–2022. The study employed a descriptive and explanatory research design with a quantitative research approach. The Augmented Dickey-Fuller (ADF) and Phillips-Perron unit root test was conducted to assess the stationarity of the data. The dependent variable was the youth unemployment rate, while the explanatory variables include gross domestic product, gross domestic saving, inflation rate, and real effective exchange rate. The finding suggests that gross domestic product, real effective exchange rate, and inflation have statistically significant impacts on the youth unemployment rate in the short run. The long run model suggests that gross domestic product, gross domestic saving, real effective exchange rate, and inflation have a statistically significant impact on youth unemployment. Finaly, policy makers need to concentrate on enacting measures that promote economic growth, such as bolstering important sectors of the economy and concentrate on industries with a high capacity for absorbing labour to guarantee that growth results in job creation.
Keywords: Youth unemployment, gross domestic product, gross domestic saving, effective exchange rate, Hungary
JEL codes: J64, J21, J23, E24

INTRODUCTION

There are 1.21 billion young people on the globe between the ages of 15 and 24. This represents 15.5% of the overall population (*United Nations*, 2020). These young individuals are vital human resources that are needed to create resilient societies and promote sustainable development (*Lalitha*, 2023). Nonetheless, the global phenomenon of pervasive unemployment seriously affects today's youth (*Rodin & Lore*, 2013). Despite the efforts to solve it, this issue still exists since high unemployment rates particularly among youth remain a concern in many nations (*Kang*, 2021; *Yoon*, 2018). In 2023, the global youth unemployment rate was 13%, a marked improvement from the peak of 15.6% during the 2020 COVID-19 crisis. Despite this progress, around 65 million young people worldwide continue to face significant challenges in securing paid employment (*ILO*, 2024). Problems with youth employment are always important to policymakers because they have an immediate effect on social cohesion, economic stability, and the long-term development of human capital (*Barcucci et al.*, 2024). This unemployment rate, whether low or high, is influenced by a combination of economic, social, and political factors (*Avdullahi et al.*, 2022).

There are several reasons why unemployment is seen negatively by society and businesses (*Redlin*, 2023). Unemployment leads to reduced living standards and psychological distress (*Mankiw*, 2018). A utilitarian social welfare function is used to quantify the cost of unemployment, which is perceived as a welfare loss. This function takes into consideration the individual disutility that jobless workers encounter, reflecting the overall detrimental effect that unemployment has on social welfare (*Gorjón et al.*, 2020). The rise in youth unemployment and its adverse consequences are pressing social issues in contemporary society (*Abzhan et al.*, 2020; *Rodríguez-Caballero & Vera-Valdés*, 2020). It results in psychological problems of hopelessness, frustration, hostility & gradual drift of unemployed youth into all manner of criminal behaviour (*Oniore et al.*, 2015); depression constitutes a significant concern among unemployed youth (*Mokona et al.*, 2020). Being unemployed raises the chance of vulnerability to disease, mental stress, starvation, and low self-esteem (*Bell & Blanchflower*, 2011). In the face of recent economic crises and disruptions, unemployed youth individuals have experienced disproportionate adversity and are poised to emerge as the most vulnerable demographic cohort within the European Union countries for the foreseeable future (*Putun & Karatas*, 2017). Every European Union (EU) member state faces an issue with youth unemployment (*Lambovska et al.*, 2021). There exists a substantial correlation between the employment status of youth and the overall economic and labour market circumstances. A rising rate of unemployment frequently signals a deteriorating state of the labour market as a whole (*Bal-Domańska*, 2022).

The labour market has experienced a significant shock following the global financial crisis, leading to unprecedented spikes in unemployment rates across numerous countries, reaching levels unseen for decades (*Gorjón et al.*, 2020). Over the past decade, the number of young people neither in employment, education, nor training (NEET) has reached a seriously high level in many European countries (*Assmann & Broschinski*, 2021). This higher unemployment was due mainly to the presence of more stringent rules of the labour market, which represented an obstacle to achieving full employment (*Liotti, 2022; Potužáková & Bílková*, 2022).

Youth unemployment remains a major concern in Hungary with various macroeconomic and structural factors influencing its dynamic. Several studies have explored the causes and implications of youth unemployment. However, while these studies have made important contributions, there are still gaps in the literature, particularly concerning the integration of macroeconomic variables and the specific Hungarian context. Thus, the main motivation of this research is to fill this gap by investigating the determinants of youth unemployment in Hungary. The following research issues were generally intended to be addressed by the study.

1. What is the trend of youth unemployment in Hungary?
2. What is the effect of gross domestic product on youth unemployment in Hungary?
3. Does gross domestic saving have an impact on youth unemployment in Hungary?
4. How does inflation influence youth unemployment in Hungary?
5. What is the effect of change in real effective exchange rate on youth unemployment in Hungary?

LITERATURE REVIEW

Theoretical studies

Unemployment is defined as individuals of working age who are not currently employed, have actively sought employment in a recent period, and are prepared to commence work when a suitable opportunity arises. This definition emphasizes three main characteristics of unemployment: lack of employment, active job seeking, and being immediately available for work (*ILO*, 2023). It serves as crucial indicator of the state of the labour market and is often used to assess both the effectiveness of the labour market and the state of the economy (*Bosna*, 2022). Theoretical models often link unemployment with macroeconomic variables such as gross GDP and inflation. For instance, *Okun* (1963), proposed empirical relationship between fluctuations in real Gross Domestic Product (GDP), representing an economy's output, and corresponding changes in the unemployment rate (*Plosser & Schwert*, 1979*; Usman & Elsalih*, 2018) This principle is grounded in the notion that variations in economic activity levels, as indicated by real GDP, are correlated with variations in the level of unemployment (*Bucevska & Kozheski*, 2022). *Phillips* (1958), investigated the relationship between unemployment and the rate of change of money wage rates in the United Kingdom laying the foundation what is now known as the Phillips Curve. The study found an inverse relationship between unemployment and wage inflation. The Phillips Curve concept has been widely applied to analyse labour market stability and the trade-offs policy makers face between maintaining low inflation and reducing unemployment.

According to *Keynes* (1937), unemployment arises not from the imperfection in the labour market but from insufficient aggregate demand in the economy. This framework emphasizes the critical role of macroeconomic factors such as consumption, investment, government spending, and net exports in influencing overall employment level. Keynes argued that in times of economic downtowns, reduced consumption and investment lead to a contraction in aggregate demand, resulting in higher unemployment. Keynesian theory underscores the importance of fiscal and monetary interventions to stimulate demand, especially during recessions to alleviate unemployment. *Krugman* (1994), highlighted the importance of a stable exchange rate for sustaining trade competitiveness. A stable exchange rate fosters investment and export growth, which are critical for reducing unemployment. In contrast, excessive exchange rate volatility undermines business confidence and reduces labour demand, particularly in export-dependent industries.

Empirical studies

Various research studies have explored the intricacies of youth unemployment, employing diverse variables. For instance, *Shiferaw* (2023) investigated the temporal and frequency dynamics of gross domestic product, inflation rate, and unemployment, revealing that inflation and GDP are highly impacted by unemployment. *Oniore et al.* (2015) examined the macroeconomic determinants of unemployment in Nigeria, identifying GDP growth rate, inflation rate, degree of openness, and private domestic investment significantly influence unemployment in the short run. Similarly, *Olubusoye et al.* (2023) demonstrated that youth unemployment in Nigeria is structurally influenced by factors such as government capital expenditure, real exchange rate dynamics, interest rate fluctuations, and the degree of trade openness. Many variables affect young people's labour market participation: economic conditions (growth dynamics, productivity, unemployment, labour costs), legal and social policies, educational and vocational training systems, technological advancements (*e.g.*, *R&D*, *ICT*), social and cultural aspects, globalization, and demographic trends like population aging and migration (*Pennoni & Bal-Domańska*, 2022).

Regional studies have also provided valuable insights. *TOMIĆ* (2018) identified key determinants influencing youth unemployment in Europe, including inadequate GDP growth, a diminished share of construction activity, and elevated levels of public debt. *Papík et al.* (2022) explored youth unemployment in Slovakia, revealing a statistical relation between high school graduate unemployment rate and various factors including the overall unemployment rate in the region, GDP per capita, quality of high school education, and cost of living immediately after graduation. *Caporale & Gil-Alana* (2014) highlighted the long-term relationships between GDP and inflation, and youth unemployment in Europe. Empirical investigations into the relationship between foreign direct investment and unemployment are abundant. Researchers such as *Chang* (2005), *Schmerer* (2014), *Atilaw Woldetensaye et al.* (2022) and, *Kukaj et al.* (2022) have highlighted the influence of foreign direct investment on unemployment. Furthermore, *Swastika & Masih* (2016) confirmed a negative long-term relation between inflation and unemployment in Australia.

Concerning the relationship between gross domestic saving and unemployment, significant negative associations have been observed in the OECD countries (*Bayrak & Tatli*, 2018). Negative relationships have been noted between the exchange rates and unemployment in various countries, such as Iran (*Bakhshi & Ebrahimi*, 2016), Brazil (U*sman & Elsalih*, 2018), and the EU countries (*Belke*, 2005). During the previous decade, Hungarian youth unemployment rates have moved in parallel with the economic and labour market patterns observed across Europe (*Bíró-Nagy & Szabó*, 2022). However, substantial disparities persist within the country. Specifically, Budapest and western regions exhibit notably higher employment rates, while the eastern and southwestern areas demonstrate significantly lower employment rates (*Mura L.*, *et al.*, 2022; *Szegediné Takács*, 2021).

Tosun et al. (2024) conducted a cross-national study exploring young people's perceptions of youth unemployment across 11 European countries, including Hungary. The findings revealed that approximately 50% of respondents perceived youth unemployment as a serious issue. It is also mentioned that the living conditions for most families have deteriorated, accompanied by a rise in the unemployment rate (Kerezsi, 2018). This situation is particularly concerning given the high unemployment rates observed in the country (*Danacica*, 2014). Unemployment is also associated with the risk of suicide in the Roma population in Hungary (*Almasi et al.*, 2009). Likewise, the residents of Túrkeve identify the primary challenges facing the town as elevated levels of unemployment (*Szendrei*, 2013). The other factor contributed to high unemployment in Hungary was attributed to labour force discrimination as explained by *Fuzesi et al.* (2009). *Audas et al.* (2005) investigated youth unemployment and labour market transition in Hungary. The study emphasises individual level determinants such as education, labour market experience, and regional disparities.

MATERIAL AND METHODS

Research design and approach

In this study we employed a descriptive and explanatory research design with a quantitative research approach. The descriptive aspect of the research design is employed to systematically describe the characteristics of the variables under investigation. Descriptive research enables the study to establish a baseline understanding of these variables, offering insights into their distribution, central tendencies, and variability over time. The explanatory component of the research design is essential for investigating the causal relationships between the variables. This design is focused on understanding how different factors, such as economic growth, inflation, and exchange rates, influence youth unemployment rates. By using an explanatory approach, the study aims to identify not only correlations but also the underlying mechanisms that drive changes in youth unemployment.

Data type and source

The study employed a quantitative data type that enables statistical analysis of numerical values related to the variables being examined. The research used only secondary data sources, particularly, the study's secondary data set including 31 years from 1992 to 2022. This dataset was obtained from the World Bank, a reputable international financial organization well-known for its thorough and trustworthy worldwide economic and social data.

Method of Data Analysis

The study employs two complementary types of data analysis: descriptive and inferential analysis. Descriptive statistics are utilized as a preliminary step to summarize and understand the basic features of the dataset. This approach involves calculating measures such as the mean, standard deviation, minimum, and maximum values for each variable under study. For the inferential analysis, the study utilizes the Autoregressive Distributed Lag (ARDL) model, a powerful econometric technique ideal for analysing time series data. The ARDL model is particularly beneficial when dealing with variables that are integrated of order zero, I (0), or one, I (1), as it can accommodate a mix of stationary and non-stationary data (*Nkoro & Uko*, 2016). The ARDL model is employed to estimate the youth unemployment rate by examining both short-run and long-run relationships between youth unemployment and key explanatory variables, including GDP growth, inflation, gross domestic savings, and the real effective exchange rate.

MODEL SPECIFICATION

In this study, we applied ARDL model since it has many advantages over the other time series models such as VAR and VECM. The ARDL model has an advantage that it does not require all variables to be integrated of the same order I (0) or I (1) and hence we can test the relationship between non-stationary variables which can be converted into stationary at different order of integration. Secondly, this model enables us to select appropriate lag to be included in the equation in a way that it will reduce the possibility of correlation in residuals (*Kripfganz & Schneider*, 2023). Using specific variables of this study, the ARDL functional relationship between youth unemployment rate and its explanatory variables (*Table 1*) can be specified as YUR = f (GDP, GDS, INF, REER). Starting from this, we developed the Auto Regressive Distributed Lag (ARDL) model as specified below (1) and (2).

$$y_t = \alpha_0 + \sum_{i=1}^{p} \gamma_i \Delta y_{t-i} + \sum_{j=0}^{q} \beta_j' \Delta X_{t-j} + \varepsilon_t \tag{1}$$

$$yur_t = \alpha_0 + \sum_{i=1}^{p} \gamma_i \Delta yur_{t-i} + \sum_{i=0}^{q1} \theta_{1i} \Delta gdp_{t-i} + \sum_{i=0}^{q2} \theta_{2i} \Delta gds_{t-i} + \sum_{i=0}^{q3} \theta_{3i} \Delta inf_{t-i} + \sum_{i=0}^{q4} \theta_{4i} \Delta reer_{t-i} + \beta_1 gdp_{t-1} + \beta_2 gds_{t-1} + \beta_3 \inf_{t-1} + \beta_4 reer_{t-1} + \varepsilon_t \tag{2}$$

Where ε_t is the white noise error term, the coefficients γ_i scalars for p lag length of dependent variable and β_j are a row vector for all independent variables included in the model with respective lag length.

Table 1: Variable description

Acronym	Description	Source	Expected sign
YUR	Youth unemployment rate (% of total labor force ages 15–24) (modeled ILO estimate)	World Bank	Dependent variable
GDP	Gross domestic product (annual %)	World Bank	Negative
INF	Inflation, consumer prices (annual %)	World Bank	Negative
GDS	Gross domestic savings (% of GDP)	World Bank	Negative
REER	Real Effective Exchange Rate (Real effective exchange rate is the nominal effective exchange rate (a measure of the value of a currency against a weighted average of several foreign currencies) divided by a price deflator or index of costs.)	World Bank	Negative

DATA ANALYSIS

Descriptive Analysis

Table 2 presents the descriptive statistics for the dependent and independent variables, providing insights into their central tendency, dispersion, and range within the dataset. The average youth unemployment rate over the observed period is documented at 17.25%, with a standard deviation of 5.49%. Fluctuations in the youth unemployment rate span from 10.16% to 28.14%. The mean gross domestic product (GDP) registers at 2.3%, accompanied by a standard deviation of 3.04%. GDP exhibits fluctuations within a range of approximately -6.60% to 7.09%. The average gross domestic saving rate is 25.50% of GDP, with a standard deviation of 4.49%. The values range from 12.42% to 31.24%, indicating a relatively broad dispersion in saving behaviour across the years, which could influence long-term investment and employment dynamics. The inflation rate has a mean value of 8.66%, with relatively high variability (standard deviation of 7.86%). The inflation rate ranges from a slight deflation of -0.23% to a peak of 28.31%, reflecting significant price instability, especially in the early transition years of the Hungarian economy. The REER has an average value of 85.62, with a standard deviation of 12.01. The minimum and maximum values are 64.03 and 104.89, respectively, showing noticeable fluctuations in Hungary's external competitiveness over the period.

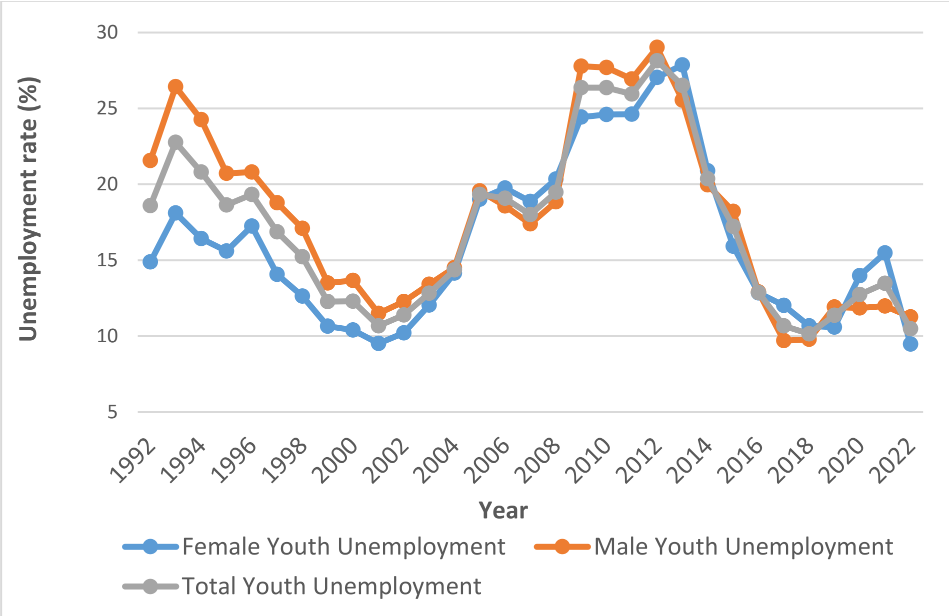
Table 2: Descriptive Statistics

Variables	Mean	Standard dev.	Min	Max
YUR	17.25	5.49	10.16	28.14
GDP	2.31	3.04	-6.60	7.09
GDS	25.50	4.49	12.42	31.24
INF	8.66	7.86	-0.23	28.31
REER	85.62	12.01	64.03	104.89

Source: Based on *World Bank* (2024) data

Figure 1 displays the overall youth unemployment rate over time as well as the youth unemployment rate by sex (male and female) for Hungary from 1990 to 2022. Female youth unemployment was higher than male youth unemployment in the early 1990s. Around the beginning of the 2000s, there was a noticeable drop in youth unemployment for both genders, with a low point being reached in 2002 - 2003. Following this time frame, the unemployment rate started to climb once more. Youth unemployment rose sharply between 2008 and 2010, reaching a peak around that same year. The effects of the global financial crisis were evident throughout this period, as both male and female jobless rates rose sharply. The rate of youth unemployment began to fall after peaking in 2010, and it reached another low point around 2018. The youth unemployment rates for men and women during this time were comparatively similar.

Figure 1: Youth Unemployment Rate of Hungary by Sex



Source: Based on *World Bank* (2024) data

The graph indicates that there was another increase in youth unemployment around 2020, because of the COVID-19 pandemic. But soon after, there is a drop in rates, with a decrease in unemployment for both men and women. The rates of youth unemployment for men and women have exhibited comparable patterns over the duration, frequently trending in tandem. There have been times, though, when the unemployment rate for one gender was marginally higher than the other. For instance, female youth unemployment was consistently greater than male young unemployment in the early 1990s. However, male youth unemployment did periodically surpass female unemployment between the mid-2000s and around 2015.

The overall youth unemployment rate typically follows the patterns of both the male and female unemployment rates. Significant rises in the total rate occurred during the COVID-19 pandemic and the global financial crisis, however the rate fell in the interim and following these events. The graph's most recent years (2021–2022) demonstrate that the rate of youth unemployment has once again declined following its high, around 2020. This trend suggests a recovery from the pandemic-induced economic downturn.

ECONOMETRICS ANALYSIS

Testing for Stationarity

Most empirical studies that use time series data assume that the series is stationary, which means that its variance and mean do not change over time (*Gujarati D.*, 2004).

The stationarity test serves as a critical step in time series analysis, providing insights into the underlying behaviour of the data. To verify the data's stationarity, we employed the Phillips-Perron unit root test and the Augmented Dickey-Fuller (ADF) test (*Table 3*). The hypotheses of interest are H0: series contains a unit root versus H1: series is stationary (*Rachev et al.*, 2012). Accordingly, gross domestic products were stationary at level, while youth unemployment rate, inflation rate, gross domestic saving, and real effective exchange rate were stationary after taking the first difference.

Table 3: Unit Root Test Results

Variables	ADF test p-value		Perron test p-value		Stationary at level
	At level	At 1st difference	At level	At 1st difference	
GDP	0.0001	-	0.0001	-	
YUR	0.7260	0.0022	0.5156	0.0016	1st difference
INF	0.3151	0.0002	0.3209	0.0002	1st difference
GDS	0.2740	0.0000	0.2793	0.0000	1st difference
REER	0.3555	0.0002	0.3624	0.0001	1st difference

Table 4 illustrates the Bounds test for cointegration. To ascertain whether there is a long-run equilibrium relationship between the variables in a regression model, we employed the Bounds test for cointegration. We used the Bounds test because the variables are integrated at I (0) and I (1) (*Pesaran et al.*, 2001). The outcomes of the ARDL Bounds Test support the long-term relationship between the variables. The null hypothesis is rejected because the F-statistic (12.988) is greater than the upper bound critical values and the t-statistic (-5.698) is less than the lower bound critical values at all significant levels. This suggests that the variables are integrated, moving together over time with a stable long-term relationship.

Table 4: ARDL Bounds Test Result

Significance level	Critical values (F)		Critical values (t)		Decision rule
	I (0)	*I (1)*	*I (0)*	*I (1)*	
10% (L_1)	*2.45*	*3.52*	*-2.57*	*-3.66*	*Reject H0 if;*
5% (L_05)	*2.86*	*4.01*	*-2.86*	*-3.99*	*F > CV for I (1) regressor*
2.5% (L_025)	*3.25*	*4.49*	*-3.13*	*-4.26*	*t < CV for I (0) regressor*
1% (L_01)	*3.74*	*5.06*	*-3.43*	*-4.60*	

F-statistic value = 12.988   H0: There is no long-run relationship between the variables
t-statistic value= -5.698   H1: There is a long-run relationship between the variables

As we can see from *Table 5*, the adjustment coefficient for the lagged dependent variable (L1.yur), with a value of -0.4398 and a p-value of 0.000, which has high statistical significance. This negative coefficient means that the youth unemployment rate (yur) has an influence from its past values showing inertia or persistence. The coefficient (-0.4398) points out that about 43.98% of the gap from the long-term balance gets fixed each period. This means when the youth unemployment rate deviates from its long-term balance value 44% of the difference adjusts back toward balance in the next period. The negative sign suggests that the youth unemployment rate tends to go back to its average or balance value over time. If unemployment was high before, it would go down next, and the other way around. The p-value of 0.000 backs up that this effect matters and is not just by chance supporting the idea that past unemployment levels have a strong impact on future levels. This coefficient hints that any shocks to the youth unemployment rate in Hungary do not last and will fix themselves bringing down the unemployment rate as time goes on.

Table 5: Long-run and Short-run Estimation of ARDL Model

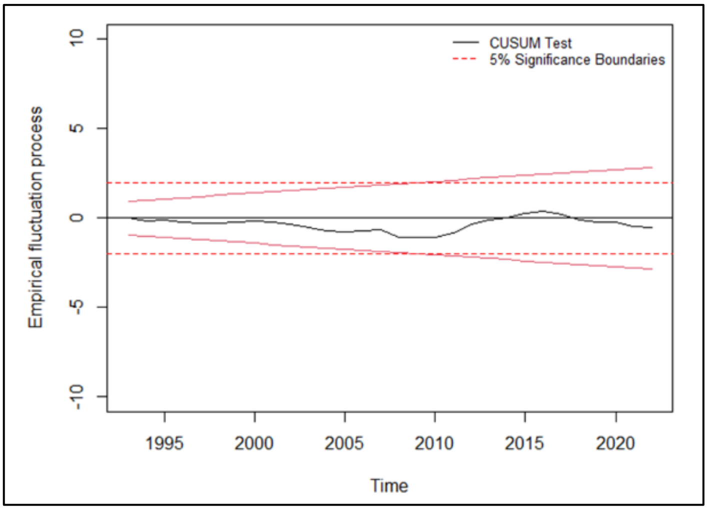
D.yur	Coefficient	Std. err.	t	P>|t|	[95% conf. interval]	
ADJ						
yur						
L1.	-0.4397688	0.0771768	-5.70	0.000	-0.6007568	-0.2787809
LR						
Gdp	-1.099651	0.3649074	-3.01	0.007	-1.860834	-0.3384672
Gds	-0.6847485	0.2347497	-2.92	0.009	-1.174428	-0.1950691
Reer	0.577349	0.1383608	4.17	0.000	0.2887334	0.8659647
Inf	0.5580994	0.2341709	2.38	0.027	0.0696274	1.046571
SR						
gdp						
D1.	0.2447488	0.1126526	2.17	0.042	0.0097597	0.4797379
gds						
D1.	-0.0003161	0.1789775	-0.00	0.999	-0.3736566	0.3730244
reer						
D1.	-0.3247618	0.1013543	-3.20	0.004	-0.5361831	-0.1133405
inf						
D1.	-0.2573694	0.1022495	-2.52	0.020	-0.4706582	-0.0440806
-cons	-7.480551	6.621917	-1.13	0.272	-21.29363	6.332526

R-squared = 0.7931; Adj R-squared = 0.7000; Breusch–Pagan/Cook–Weisberg test for heteroskedasticity chi2 = 0.90 Prob > chi2 = 0.3416; Ramsey RESET test F (3, 23) = 0.74 Prob > F = 0.5404; Durbin–Watson d-statistic (10, 30) = 2.0355533; Shapiro-Wilk W test for normality: Prob > F=0.31421; Mean VIF=2.58

The R-squared value of 0.7931 indicates that 79.31% of the variance in the youth unemployment rate is explained by the model's predictors, suggesting a robust fit. The adjusted R-squared value of 0.70, which adjusts for the number of predictors, further confirms the model's strong explanatory power, indicating that the model accounts for a substantial portion of the variability in youth unemployment. To check the stability of the estimated ARDL model, we performed the CUSUM test. The results are shown in *Figure 2* which indicates that the model residuals are stable over time, suggesting no significant structural break in the model.

GDP has a statistically significant negative relationship with youth unemployment rate in the long run. This suggests that a one-unit increase in GDP is associated with a decrease of approximately 1.10 units in youth unemployment rate. The negative sign implies that as GDP increases, the variable youth unemployment rate decreases, which reflects inverse economic relationships. The finding is consistent with studies such as *Bruno et al.* (2014), Dietrich (2012), *Hasan & Sasana* (2020), and, *Živković* (2022). However, the short-run estimation results of the ARDL model portrays that GDP had a positive effect on youth unemployment. Specifically, a one unit increase in GDP is associated with an increase of approximately 0.2447 units in the youth unemployment rate.

Figure 2: Cumulative Sum of Residuals (CUSUM) Test for Model Stability



The relationship between Gross Domestic Saving (GDS) is negative and significant in the long run, indicating an increase in GDS leads to a decrease in youth unemployment rate. That means a one-unit increase in gross domestic saving is associated with a decrease of about 0.68 units in the youth unemployment rate. This suggests that higher savings might be correlated with lower youth unemployment rate, possibly due to shifts in investment patterns or consumption. However, in the short run GDS has no effect on youth unemployment.

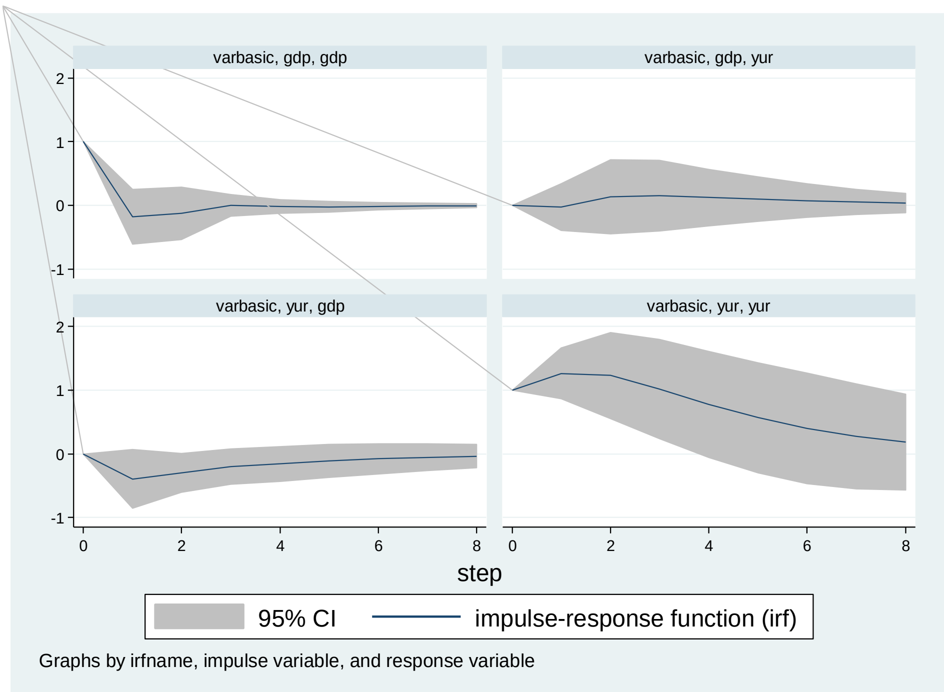
Gross domestic saving has a connection to investment, but investments need time to create jobs. In the short term, savings might not turn into productive investments that generate employment for young people, who may need specific programs or industries to open chances for them (*Nunziata*, 2002). The positive coefficient of 0.5773 for real effective exchange rate (REER) is statistically significant, indicating that an increase in REER (appreciation of Hungarian Forint) is associated with an increase in youth unemployment rate in the long run. Specifically, a one-unit increase in REER leads to an approximate increase of 0.58 units in youth unemployment rate. This positive relationship suggests that as the real exchange rate is appreciated, the youth unemployment rate also tends to rise. The result is consistent with studies such as *Banda & Choga* (2015), and *Adzugbele et al.* (2020).

Our finding shows that there is an inverse relationship between Hungary's youth unemployment rate and inflation rate, supporting the Phillips model in the short run. That means, a 1-unit increase in the inflation rate is associated with a decrease of approximately 0.2574 units in youth unemployment rate. However, the long-term result shows a positive relation between youth unemployment and inflation. The result is coherent with *Tenzin* (2019). Generally, the short run model suggests that GDP, REER, and inflation have statistically significant impacts on the dependent variable in the short run. GDP has a positive effect, while REER and inflation have negative effects. GDS does not show a significant effect in the short run. A similar finding is observed in (*Popescu & Diaconu (Maxim)*, 2022)

IMPULSE RESPONSE FUNCTION OF YOUTH UNEMPLOYMENT RATE FOR GDP

The Impulse Response Function (IRF) graph (*Figure 3*) provides valuable insights into the dynamic interactions between gross domestic product and the youth unemployment rate over time, following shocks to each variable.

Figure 3: Impulse Response Function for GDP and Youth Unemployment Rate



The response of GDP to its own shock indicates an initial decline in domestic savings, as seen by the downward trend in the first period, suggesting that a disruption in the savings sector leads to a short-term contraction. However, this effect stabilizes after two periods, with GDP returning to its pre-shock level, implying that the economy can absorb and adjust to such disturbances relatively quickly. When it comes to the impact of a GDP shock on youth unemployment, the response suggests that a positive shock to GDP initially leads to a small, yet noticeable, increase in unemployment rate. This outcome might appear counterintuitive but could be explained by the possibility that in the short run, increased savings could reflect reduced consumer spending or economic contraction in sectors that immediately impact employment. Nevertheless, this increase in youth unemployment is only temporary, as the unemployment rate begins to stabilize and gradually dissipate over time. This suggests that while GDP shocks might negatively affect employment in the short run, the long-term impact is neutral. On the other hand, the response of GDP to a shock in youth unemployment reveals that an increase in youth unemployment has a negative impact on GDP in the short run. The immediate decline in GDP following youth unemployment tare shock suggests that rising unemployment, particularly among the youth, suppresses overall economic activity, possibly due to reduced productivity or consumption. However, like the previous case, the adverse effect on GDP diminishes over time, with the economy showing signs of recovery after two periods, ultimately stabilizing in the long run. Finally, the response of the youth unemployment rate to its own shock shows that an increase in youth unemployment leads to a further rise in unemployment initially, but this effect gradually decreases over time. This suggests that shocks to youth unemployment tend to be temporary, with the economy slowly adjusting and unemployment rates declining back toward their original levels in subsequent periods. In summary, the IRF analysis highlights the short-term vulnerabilities and long-term resilience of both GDP and youth unemployment rate in response to shocks. While shocks to GDP and youth unemployment can have significant immediate impacts on the other variable, both tend to stabilize over time, reflecting the economy's capacity for adjustment and recovery. This dynamic underscore the complex but ultimately transient relationship between savings and employment, where short-term disruptions do not necessarily translate into prolonged economic distress. The shaded confidence intervals further illustrate that while the effects are significant in the short term, the uncertainty increases over time, highlighting the need for cautious interpretation of long-term projections.

CONCLUSION AND IMPLICATIONS

This study applied the autoregressive distributed lag (ARDL) model to examine the dynamic relationship between macroeconomic variables and youth unemployment in Hungary, using time series data from 1992 to 2022. The youth unemployment rate served as the dependent variable, with GDP, gross domestic savings (GDS), inflation, and the real effective exchange rate (REER) as explanatory variables. Unit root tests (ADF and Phillips-Perron) were conducted to ensure the stationarity of the variables before estimating the model. The empirical findings reveal a complex interplay between macroeconomic indicators and youth unemployment. In the short run, GDP exerts a positive and statistically significant effect on youth unemployment, suggesting that short-term economic growth in Hungary may not be immediately translated into better job prospects for young people. Conversely, both inflation and REER have negative short-run effects, implying that moderate price increases and improved external competitiveness may temporarily alleviate youth unemployment. Gross domestic savings do not exhibit a significant short-run impact. In the long run, all four variables GDP, GDS, inflation, and REER show statistically significant effects on youth unemployment. Notably, GDP and GDS are associated with the reductions in youth unemployment over time, supporting theoretical propositions that long-term economic growth and higher national savings can foster a more robust labour market. On the other hand, inflation and REER have positive long-run relationships with youth unemployment, indicating that persistent price instability and reduced international competitiveness may hinder youth employment prospects.

From a theoretical standpoint, the Hungarian case lends itself well to testing key economic hypotheses regarding the roles of macroeconomic stability and resource mobilization in addressing structural unemployment. For example, the inverse long-run relationship between GDS and youth unemployment supports endogenous growth theories that link domestic saving and capital formation to labour market outcomes. Similarly, the positive short-run effect of GDP on youth unemployment highlights the limitations of traditional Keynesian assumptions when applied to labour market rigidities and skill mismatches. The results underscore the importance of context-specific economic mechanisms. While macro-level variables are influential, the time dimension and structural characteristics of Hungary's labour market including youth-specific barriers must be considered when interpreting the effects. The evidence suggests that aggregate economic expansion alone is insufficient to reduce youth unemployment in the short term without parallel structural adjustments, such as better matching between educational output and labour market demand.

The long-run negative relationship between gross domestic savings and youth unemployment underscores the role of domestic capital in fostering job creation. Economic policies that encourage household and institutional saving and effectively allocate these resources toward labour-intensive and innovation-driven sectors, can contribute to long-term reductions in youth unemployment. Moreover, efforts to control price volatility and maintain external competitiveness (through an appropriate real exchange rate policy) can enhance the long-term prospects for youth employment.

In conclusion, this study contributes to the literature by empirically validating several theoretical relationships between macroeconomic variables and youth unemployment. Hungary serves as a relevant case through which these dynamics can be explored, but the findings also invite further comparative research to test the generalizability of these results across different institutional contexts.

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A DIPLOMATIC INCIDENT - THE POLITICAL RISK OF CORPORATE DIPLOMACY AND THE IMPLEMENTATION OF CORPORATE DIPLOMACY STRATEGY CONCEPTS WITHIN SCRUTINIZED INDUSTRIES

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ABSTRACT

The geopolitical environment of multinational corporations (MNCs) is increasingly volatile. For the purpose of mitigation, many MNCs are trying to strengthen their corporate social responsibility programs. Nevertheless, corporations are often faced with harsh stakeholder increased criticism, scrutiny and even sheer hostilities. Corporate diplomacy concepts are addressing these problems by engaging in dialog with unwanted stakeholders since, amidst the geopolitical conflicts around the world, corporations still need to grow their business operations. However, even in countries in which market orientated economic policies predominate, MNCs are today often in disputes with host governments, while additionally new political activist movements are building up political pressure, amplifying accumulated social concerns regarding the negative environmental impact of corporations. In the future, it will be increasingly important for companies to protect their business operations from government interference and other unwanted stakeholders. However, concepts and strategies of corporate diplomacy need to be reviewed, in terms of practical applicability under changing sociopolitical and geopolitical circumstances. Especially in industries that are under heavy stakeholder scrutiny, current corporate diplomacy concepts are difficult to implement. This research illustrates the political risks of corporate diplomacy and suggests where the current concept of DIPLOM needs revision by attempting to apply this established theoretical concept to a corporation operating in a challenging business environment.
Keywords: country risk, political risk, corporate diplomacy
JEL codes: D20, D21

THE CASE FOR CORPORATE DIPLOMACY

Present global economic and geopolitical conflicts around the world are leading to international tensions reminiscent of the Cold War, which is accumulating political risk for internationally operating corporations. Common political risks are governments' interference, political instability, and changes in government policies adverse to the corporation's interests. Affected multinational corporations (MNCs) are currently facing difficult political environments in both their home and host countries. Alongside public relations, governmental affairs, and other business strategies dealing with mitigating such risks, corporate diplomacy strategies aim to establish relationships with unwanted stakeholders and, in the process, gain a social license for their business operations (*Steger*, 2003).

Steger (2003, p. 6–7.) described corporate diplomacy in his work as follows: ”Therefore, Corporate Diplomacy is an attempt to manage systematically and professionally the business environment in such a way as to ensure that business is done smoothly [...] and an interaction that leads to mutual adaptation between corporations and society (in a sense a co-evolution).” Managing the business environment includes addressing the influence of stakeholders, particularly unwanted stakeholders. Corporate diplomacy conducts diplomacy in the sense of trying to engage two or more parties with opposite views in a dialog, which could allow them to reach an agreement. While state diplomacy can aim for neutrality, corporate diplomacy wants to reach the aforementioned social license to proceed with operational activities. *Henisz* (2014) revisits the concept of a social license for corporations too. Securing the operational activities of any MNCs by gaining the acceptance of stakeholders was his ambition for the DIPLOM concept, and he linked his work indirectly to Steger.

Henisz (2014) presents examples of business cases in his book in which corporate diplomacy was needed, including some successful applications of corporate diplomacy. One of those positive examples took place in Nigeria, within the oil and gas industry, not unlike the case study of this paper. According to the analysis by Henisz, Chevron made the mistake, in the aftermath of the outbreak of violence after the general election in 2003, which affected the country's stability, of presenting the local community stakeholder with fully planned CSR projects without the possibility of local stakeholder participation. In 2004, Chevron changed their approach and conducted corporate diplomacy by including the stakeholders in the project actively. As a result, Chevron simply presented the amount of funds available for CSR projects and took part in the committee, where community leaders decided how the funds would be used. By giving the communities the chance to actively participate in their development, Chevron was able to increase their reputation among the local stakeholders and continued successfully with their exploration activities in Nigeria in the following years (*Henisz*, 2014, p. 98.).

While there are several publications on corporate diplomacy, including further arguments for it, in this research, three main reasons for corporate diplomacy are assumed:

1. The need for corporate diplomacy is based on the threat of government interference.
2. The need for corporate diplomacy is based on the influence of political activist movements.

3. The need for corporate diplomacy is based on the stakeholder reception of MNCs actions.

The immediate political risk for any MNC is government interference, which is especially high in countries suffering from difficult and shifting political circumstances. The general threat of government interference has increased constantly over the last decade since the world is amid becoming a multipolar world in a geopolitical sense, leading to tensions negatively inflicting global commerce and trade (*Ashford & Cooper*, 2023) Governments will intervene more often in corporations' activities in the future, either directly or indirectly, with immediate effects or long-term implications Recently, the United States has been engaging with companies more directly in this regard, blocking Huawei from participating in U.S. government projects (*Cen et al.*, 2020). In European countries, an accumulation of anti-business regulations regarding foreign direct investments (FDI) and mergers & acquisitions (M&A) activities with foreign corporations' participations followed to protect national interests. Some legislation required for this purpose did become law recently in Germany, enabling the German Ministry of the Economy to stop M&A projects if strategic considerations were demanding it (B*mwk*, n.d.). The additional global sociopolitical developments are also leading to further pressure on governments, including the increasing societal awareness of the role of MNCs in matters like income inequality, global tax avoidance, and the global climate crisis (*OECD*, 2021). Corporate diplomacy is focused on establishing contacts with such unwanted stakeholders. When their business operations are linked to these problems, companies can create positive forces that benefit both the business and its operations (*Huy et al.,* 2022).

An aspect where MNCs increasingly consider political risk is the re-evaluation of supply chains. Corporations examine their reliance on global supply chains affected by the COVID-19 pandemic, trying to limit the risks by creating less exposure to host countries and establishing home-based production facilities. During COVID-19, China blocked the shipping of containers, which are vital for international trade and irreplaceable in the short term for many MNCs, for tactical considerations favoring the demand of their national economies.

Therefore, home governments see global supply chains as an increased risk since they can be used as a tool for foreign governments to put pressure on the government (*Shih*, 2023). Indirectly, the founding of OPEC and the boycott of oil exports to the United States can serve as examples. It made the US painfully aware of foreign governments' possible power to negatively impact their economies. In conclusion, MNCs have most likely the support of their home government for shifting away from global just-in-time processes, not only for the purpose of job creation but also to decrease dependence. However, when such a shift in the supply chain is not possible or feasible, any political risk requires mitigation, which includes the use of corporate diplomacy.

Besides protective, anti-trade, and supply-chain protection policies augmenting political risks in host governments, the home governments of many MNCs are often restraining business operations because of political considerations too. This is a habitual state regarding the relationship between business and government, but the intensity of government interference is increasing. A company can rapidly find itself criticized by its home government and society. Contemporary example: At the beginning of the Ukraine war, companies that didn´t cease all operations in Russia became widely attacked and risked boycotts in their home country, as well as being subject to criticism from governmental spokespersons (*Doherty*, 2023).

Political activist movements are also considered stakeholders in corporate diplomacy theory. However, they have recently become more successful in gaining political influence, steering legislation, and countering corporate interests (*Davis & White*, 2015). Social media campaigns additionally build strong pressure on governments, leading to political discourse and action (*Schleffer & Miller,* 2021). The positive public relations narrative of companies as a provider of employment and tax revenue is unlikely to succeed in the future and hardly protects any global corporate interests (*Kobrin*, 2005). Companies in scrutinized industries without the ability to change their core business are especially in need of corporate diplomacy but will encounter difficulties implementing current strategies. Example: In the case of extractive industries like mining, conducting mining operations without political risk will be impossible, and while underlying demand requires the extraction of resources, it will not convince activists and politicians to cease hostilities against mining operations. It might therefore be useful for MNCs to create alternative relationships with government officials, politicians, and civil servants alike that have a more positive demeanor towards the company (*Wang et al.,* 2019).

In addition, the behavior and business practices of the executive management themselves are equally important. A recent example is the case of Apple`s CEO, who flattered the Chinese government by speaking in Beijing on the topic of long-term profitability and the reprioritizing of the mutual relationship with the country, predicting a great future for Apple in China. This happened simultaneously with the questioning of the TikTok CEO in the United States Congress, regarding privacy, big data, and concerns about espionage activities (*Sevastopulo*, 2024). Close relationships with host governments by MNCs inherit significant political risk. A variety of possible negative consequences of these relationships for MNCs in the home country exist, but some managers will ignore the political risk further (*Jallat & Coronati*, 2022). In the future, executive management and their public statements regarding governmental affairs will not only be scrutinized by NGOs, activists, but also by their own home governments.

MNCs transnational operations depend on the possibility of operating in multiple countries in the most acceptable business environments possible, which are the product of global markets and global trade routes. However, recent geopolitical developments have made it clear that national interest can lead to economic nationalist policies, like mercantile and protection policies and some global markets are under constant threat of government interference. Even the USA, famous for their global economic dominance, is therefore recognizing the political risk of international supply networks and empowering their national supply chains with the Inflation Reduction Act (D*emocrats*, 2023). Furthermore, the USA is becoming increasingly protective of its domestic markets. The European Union had similar developments in recent weeks with the establishment of an import tax on Chinese electric vehicles. With an augmentation of anti-globalization sentiment in the world, the strategies summarized under the term corporate diplomacy must become relevant to every MNC.

Therefore, this research argues in favor of corporate diplomacy and reevaluates the corporate diplomacy concept of DIPLOM of Henisz with the use of a theoretical case study.

THE POLITICAL RISK OF CORPORATE DIPLOMACY

Political risk is inherent when conducting corporate diplomacy. When connections between corporations and governments become public knowledge, hostile stakeholders will portray these connections in a negative light. The connections between corporations and governments are, for many people, linked to undue influence on democratic procedures and decision-making. Corporate diplomacy is, like every other effort of government outreach, linked to corrupt practices in the criticism of government outreach (*Myint*, 2000). A string of infamous cases of MNCs, connected to corruption scandals supports this assumption.

A second political risk is that the government of the host country is affected by new global geopolitical tensions in a way that makes it impossible to mitigate hostilities because the host government has shifted in their political alliances. Multiple governments are now able to pressure host governments in the developing world to make decisions regarding the activities of foreign companies in their country. These developments will increase, which means corporate diplomacy must soon develop new concepts for sudden government policy changes and further include the risk that investors and financial institutions could retreat from investments.

This includes foreign direct investments (FDI), which were generally welcomed by countries globally, but these investments are also politicized today (*Anderson*, 2020). Often, companies are facing political business environments in which they need to protect their business operations from foreign governments and foreign corporations that are state-backed. Corporate diplomacy activities can be observed by foreign governments as actions of a foreign agent, which makes it even more difficult to apply successfully.

CORPORATE DIPLOMACY AND THE PROBLEM OF POLITICAL CORRUPTION

The area where corporate diplomacy is currently conducted in terms of stakeholder outreach is in corporations' corporate social responsibility (CSR) programs. CSR is often focused on the issue of environmental sustainability and, therefore, is not negatively associated with issues like political corruption (*Arafa*, 2011). The very term 'governmental affairs' in the context of MNCs often carries negative connotations, however, for corporate diplomacy measures to be effective, companies must intensify their outreach to government stakeholders while operating under increased public scrutiny. These measures must consider the risk of corrupting governmental processes.

As a framework for corruption, this research uses the United Nations Convention Against Corruption. The convention includes the ambition to strip government officials of illegally obtained monetary gains. This includes bribes and undeclared payments to governments. Article 12 refers here exclusively to payments by the private sector. Therefore, corporations should use the conventions as guidance when assessing their corporate diplomacy strategies for illegal practices. Additionally, this research defines the word Public Official in accordance with the convention. Articles 7 and 8 refer to public officials, explicitly including civil servants. The convention seeks to strengthen certain aspects of employment conditions to reduce vulnerability to bribery, as specified in Articles 15, 16, and 21. This is important for government outreach activities conducted by corporations, to preserve every corporate diplomacy action from payment plans to host governments that are illegal (*United Nations*, 2004).

If corporate diplomacy concepts include outreach to public officials, the concept cannot include monetary or material transfers that benefit the public official. Furthermore, meetings with public officials must always be on the record and should always be in government buildings or in the offices of the MNC. Corporate diplomacy must therefore always operate within the framework of the United Nations Convention Against Corruption; otherwise, it risks irreversibly tainting its efforts. In addition, MNCs should further consult the OECD's Convention on Combating Bribery of Foreign Public Officials in International Business Transactions (*OECD*, 2024). This can be seen in the following case study: Tullow Oil publishes in their CSR report the payments to governments without further details. Intended as a transparency measure, it could be portrayed negatively by critics.

THE PROBLEM WITH CORPORATE DIPLOMACY IN SCRUTINIZED INDUSTRIES

Corporate diplomacy relates to the public relations work of a corporation (*Steger*, 2003). Nevertheless, corporate diplomacy must differ from normal public relations practices as well as lobbyist activities. Lobby groups, even long-established firms, are subject to intense scrutiny from activists and governments alike and are considered an outdated method in public relations (*OECD*, 2009). Furthermore, establishing relationships with political advisers from major consulting firms like PWC, McKinsey, and others is risky because of their increasingly negative reputation regarding government consulting (F*rance24*, 2022).

Law firms conduct a new form of corporate lobbying. They found a new role for themselves with the creation of "country desks," which offer services as relationship managers for corporations (*Hakim*, 2017). However, the utilization of law firms for corporate diplomacy will be inadequate, since they are likely to focus on solutions based on a stable legal framework, which reduces legal risks. They are also not the best operators in any geopolitical or international management task related to securing business operations, which are subject to international political developments. Most likely, they are insufficient considering changes or developments other than changes in the legal framework. Therefore, corporations are compelled to conduct government outreach themselves with a minimum amount of externality, conducting the search for suitable partners in foreign governments after an in-house assessment.

The number of possible government contacts for corporate diplomacy, which can be established by a corporation, is different for every corporation. An international small or midsize company (hereafter SME) planning to open a subsidiary in a host country will probably have only government contacts within the local community and government administration, in which they register the company. A MNC, however, will have government contacts within the ministries the economy, trade, state, and development. Long-term corporate diplomacy strategies must consider a new direction in creating long-term relationships with host and home countries. A new perspective for MNCs must include the establishment of relationships with civil servants. Civil servants can hold their positions within the government sometimes for a lifetime (*Mehde*, 2023). These governmental contacts on a ministry level are under intense public scrutiny. Contacts must justify the activities of companies in their country if they are associated with them, which makes it crucial to stay engaged and reassure such governmental contacts. Since the governmental contact will choose its own position over the interests of the corporation, the value of the contact must be constantly assessed in light of current developments. Furthermore, since corporate diplomacy operations must be planned long term, a government contact who is only in a position for a couple of years and then will be succeeded by another person, who could have completely opposite views on political and business matters, is suboptimal. However, the importance of civil servants for the function of government can currently be seen in the criticism of the Project 2025 plan, which resulted from strategic considerations by a US conservative think tank. The plan considers changing thousands of civil servant jobs into political appointees' positions, to control government processes further and politicize bureaucratic affairs, which were neutral before (*Dans & Groves*, 2023).

METHODOLOGY

Henisz's (2014) comprehensive and equally named book, Corporate Diplomacy, introduced the DIPLOM concept, consisting of the pillars Due Diligence, Integration, Personal, Learning, Openness, and Mindset.

The concept of Henisz is examined with a case study, taking into consideration that the strategies behind the pillars meet a new reality of stakeholder behavior. For a successful relationship with stakeholders, Henisz makes use of Sherry Arnstein's ladder of public participation. Arnstein's concept tries to separate company-stakeholder interaction into empty rituals of participation and real trust-building actions (*Henisz*, 2014, p. 81.). Henisz develops this concept further and demands a more proactive reputation-building on the part of MNCs. However, the therefore required dialog with stakeholders assumes that there is a possibility for a dialog, but recent years have shown a more inflexible positioning of hostile stakeholders, from political activists to government fractions alike. Exemplary corporations have a negative environmental impact and are unable to change their operations for business or financial reasons. Corporations like BP or Shell cannot engage in Europe with political activist groups due to their inconceivable positioning on environmental issues. Groups like Greenpeace interrupted many foreign operations of Shell in the past, but while a dialog with groups like Greenpeace was possible in the past, dialogues with groups like Just Stop Oil are impossible. These groups have increasing influence over political parties, which limits their options for engaging with certain political contacts.

For the following case study, the Henisz DIPLOM concept was theoretically applied, using the international oil and gas company Tullow Oil and their business operations in Ghana as a subject. Aidan Heavey founded Tullow Oil in 1985 with the aim of developing small oil fields in Africa, which were not attractive for major oil companies. The company became soon an established small and midsize producer on the African continent and could produce positive business results with their strategy, making the company a success story on the stock exchange alike (*Tullow Oil Plc.*, 2024). In 2019, the company faced production problems and an abrupt management change, with the head of exploration, Paul McDade, leaving the company (*Kollewe & Ambrose*, 2019). In addition, Tullow Oil suffered during the COVID-19 pandemic; like the rest of the industry, sales revenue declined from 2.646,9 million US dollars in 2013 to 1.634,1 million US dollars in 2023 (S*tatista*, 2024). At the beginning of March, the Guardian reported on doubts about the viability of Tullow Oil (*Ambrose*, 2020). By the end of March 2020, the company's stock price fell to 0,121 Euro. Following the pandemic and the onset of the Russia-Ukraine war, the oil price surged over 100 US dollars, causing a shift in the markets that led to the recovery of many oil companies' valuations, including Tullow Oil. At the same time, Tullow Oil sold stakes in planned projects or stopped planned exploration projects to save cost. With the revenue of the oil spike in recent years, Tullow Oil was able to reduce the debt and became marginally profitable again. Tullow Oil's new strategy is to concentrate on their remaining legacy assets in Ghana, namely the TEN and the Jubilee field. The relationship with the government of Ghana is therefore existential for Tullow Oil. As an oil and gas company, Tullow Oil operates in an industry scrutinized by both the public and governments alike. Their operations in Ghana are active; however, the company has faced recent financial turmoil and still operates with ongoing concerns regarding the possibility of business failure. These circumstances make them ideal for a case study concerning possible applications of corporate diplomacy strategies. The concept and the inherited strategies of the DIPLOM pillars will be applied to the specific situation of Tullow Oil in Ghana.

For each pillar of the DIPLOM concept, data was collected that is assumed to be linked to the aim of a specific individual pillar. This data was then used for illustration to indicate the problems of applying the DIPLOM concept in the situations it was originally developed for.

Due Diligence: Official Ghana government websites. Tullow Oil statements regarding stakeholders in Ghana.

Integration: To illustrate the problems of integration, Tullow Oil documents were examined by the executive management of Tullow Ghana Limited. Furthermore, Tullow Oil corporate social responsibility statements and annual reports were searched from 2006 until 2023 to extract revenue and CSR spending for the company. From 2007 to 2022, the data could be used for a regression analysis with CSR as the dependent variable and revenue as the independent variable.

Personal: The number of government changes in Ghana was extracted from official government websites.

Learning: Henisz references to the DAD and DDD concept were taken and compared with public information about Tullow Oil, including public statements and news reports.

Openness: Data from statista.com was examined.

Mindset: The employee satisfaction data was collected from Glassdoor and Indeed.

RESULTS

Due Diligence: Tullow Oil has been operating in Ghana for years and is aware of the stakeholders involved. Tullow Oil is engaged with both community and government contacts. Nevertheless, if Tullow Oil were to reevaluate the stakeholder in accordance with the concept, the company could identify and monitor more stakeholders with open-source intelligence. Risk analysis could also be expanded with machine learning methods like those Henisz predicted.

Integration: Since Tullow Oil would be inclined to implement corporate diplomacy strategies within corporate social responsibility measures, the corporate structure of Tullow Oil in Ghana must be assessed. Tullow Oil established in 2006 a subsidiary with Tullow Ghana Limited in the country, which is the year operations started in Ghana. In the corporate organization, the subsidiary is structured directly under Tullow Oil's headquarter in London, which makes the implementation of any business strategy concepts vertical and facile. However, within these 18 years of operations, Tullow Ghana Limited had six managing directors. This means the managing director responsible for the implementation of corporate diplomacy concepts serves only for a term of three years on average. Corporate diplomacy concepts aim for long-term relationship building; a constant local partner is therefore important for the stakeholders. If companies suffer under constant management changes, which is the case for Tullow Ghana Limited, the implementation of corporate diplomacy concepts is difficult.

Furthermore, corporate diplomacy in the form of CSR is connected, in the case of Tullow Oil, to the revenue of a company. Tullow Oil's revenue was used in a regression analysis with the company's CSR spending. The revenue displays the sales revenue of Tullow Oil for the years 2007 until 2022, while the CSR spending is the amount Tullow Oil declares in their annual reports in the same time frame as discretionary spending for CSR measures. Tullow Oils' revenue showed a good model fit as an independent variable, with CSR spending as the dependent variable. In conclusion, the integration of corporate diplomacy into the daily operations of the corporation would decrease in the case of Tullow Oil, with declining revenue. It can be assumed that this development would be the same in other scrutinized and otherwise troubled corporations. Corporate diplomacy is still seen as a public relations exertion and therefore a cost factor, which makes a full integration of corporate diplomacy difficult.

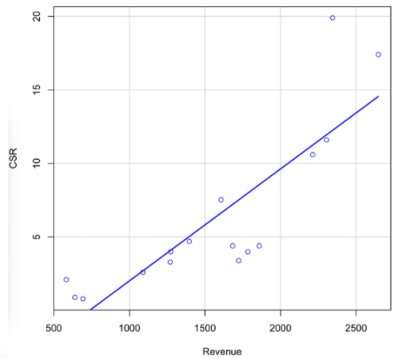
Figure 1: Results of the regression analysis

```
Call:
lm(formula = CSR ~ Revenue, data = Dataset)

Residuals:
    Min      1Q  Median      3Q     Max
-4.1604 -1.2841 -0.2205  1.2497  7.6492

Coefficients:
             Estimate Std. Error t value  Pr(>|t|)
(Intercept) -5.588989   2.195271  -2.546    0.0233 *
Revenue      0.007610   0.001304   5.834 0.0000433 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 3.176 on 14 degrees of freedom
Multiple R-squared:  0.7086,	Adjusted R-squared:  0.6878
F-statistic: 34.04 on 1 and 14 DF,  p-value: 0.00004335
```



Personal: The Ministry of Energy and Petroleum of Ghana had seven ministers in the time Tullow Ghana Limited was active. This means that, a ministerial term in government on average was only 2,57 years in this position. A long-term relationship with the responsible minister is not possible for Tullow Oil. The head of state, Nana Addo Dankwa Akufo-Addo, has been in office since 2017 and is one of four presidents in Ghana since 2006. A personal relationship would be possible; however, the potential risk and the advantages due to public awareness are questionable. In addition, according to a research article examining the CSR practices of Tullow Oil Ghana Limited, which conducted 100 interviews with stakeholders, including Tullow Oil Ghana employees, 97% of participants stated that they never had the chance to suggest appropriate compensatory CSR projects. In addition, CSR projects were mainly seen as refraining from breaking or bending the law. The respondents further disagreed somewhat about the suggestion to place CSR above profits. In general, the article showed that CSR was not practiced by Tullow Oil like it was intended to. Especially the lack of stakeholder engagement and the mindset of profit over social responsibility show that the DIPLOM concept has application problems regarding personal relationships within the case study subject (*Appah et al.,* 2021).

Learning: According to available public information, it seems that Tullow Oil has already established concepts like DDD (dialog, decide, deliver) in host countries like Ghana. In Tullow Oil reports and statements, the company is trying to illustrate the progress they have made with local communities as well as the unitary government in Accra. Tullow Oil never seemed to practice DAD (decide, announce, defend) concepts in Ghana, which would mean a lack of interest in local development and sustainability. However, according to the aforementioned research by Appah, Nketia, and Eghan, it seems that the aim of the *Learning* pillar is not achieved. The fact that Tullow Oil operates under increased pressure due to operational difficulties cannot imply a learning process of corporate diplomacy, just as with CSR.

Openness: The case of Tullow Oil exemplified the need for revision of the pillar of openness. As an oil and gas company, some public relations measures, which could be summarized under the pillar, cannot be implemented based on the hostilities the industry is facing in general. Being open about mistakes and truthful about environmental impact would give more ground to activism, protest and increase the political risks of government interference. This is true both at home and in host countries. In the case of Tullow Oil, the management must monitor the general political sentiment within the population. Tullow Oil has the second-highest market capitalization as a corporation within the country. Ghanaians are aware of the company, the activities, and the criticism. Furthermore, Ghanaians have decreased trust in government entities, including members of parliament, members of the police force, and judges (S*tatista*, 2022). In such a critical environment, where misinterpretations of corporate statements can damage the public image or lead more directly to negative business impacts, it must be questionable if openness can be executed in scrutinized industries like the oil and gas industry.

Mindset: The DIPLOM concepts demand a mindset to implement corporate diplomacy concepts successfully. It illustrates the need to convince the whole company of the need to conduct successful outreach to stakeholders. According to public sources, the employees of Tullow Ghana Limited are satisfied with their employer, which means a possible positive embrace of corporate diplomacy strategy. However, if measures require the participation of the employees, management needs to convince and monitor them, which leads, in the case of Tullow Oil Ghana, again to the problem with the rapid management changes. The company has also decreased the number of Ghanaian employees from 81% in 2018 to 75% in 2021 (S*tatista*, 2023). While this is due to business considerations, it is counterproductive to get the mindset for corporate diplomacy when local employees are important for this endeavor.

DISCUSSION

The results exhibit that Henisz's DIPLOM model has some problems in terms of its practical application. While Henisz presents multiple case studies in his book demonstrating that corporate diplomacy can positively impact business activities through stakeholder outreach, its implementation is likely to face resistance at every stage.

Considering that Henisz published the concept already in 2014, his acknowledgement of data-driven analysis for corporate diplomacy was correct. The possibilities of stakeholder research and possible identification of conflict, with the means of Large Language Models and Open Source Intelligence, increased between 2014 and 2024. Programs like ChatGPT can be used for fast text analysis of multiple stakeholder statements and social media activities of stakeholders, while web-scrapping solutions make it possible to automatically collect required data for further analysis, which makes the pillar *Due Diligence* applicable to every MNC.

The pillar of *Integration* is mainly difficult to apply because of monetary aspects, if management personnel do not undergo constant changes. The sophistication possible in stakeholder analysis can lead to fast and precise corporate diplomacy strategy application in the aforementioned corporate structures.

The *Personal* pillar requires critical revision, as the case study data indicates that these types of relationships cannot be built in difficult circumstances.

In terms of the pillar *Learning*, Henisz's recognition of the termination of the DAD (decide, announce, and defend) concept has been self-confirming since 2014.

One of the pillars, which needs critical revising and further development, is *Openness*. Application of the DIPLOM concept must recognize that social media, the current geopolitical climate, and further global sociopolitical developments have changed the behavior of stakeholder engagement. Mainly the behavior of unwanted stakeholders like global political activists and populist political parties or movements. The concept needs a contemporary revision and new methods for stakeholder outreach or even protection from stakeholders.

The pillar *Mindset* depends on every individual company itself. The ability of the management to convince companies and stakeholders of the corporate diplomacy measures will determine the change towards a positive mindset for such strategies.

In conclusion of the case study results, this research illustrates the application problem of the DIPLOM concept in difficult business situations. Nevertheless, the concept already showed in 2014 the future possibilities of stakeholder due diligence, but the theoretical aim of the concept is still valid. The results suggest a revision and a further development of the concept in general, but recognize the important and, in some ways, visionary concept of Henisz.

CONCLUSION

Corporate diplomacy must aim for the optimal handling of unwanted stakeholders, which requires the identification of key figures of any hostile political movement or government entity against the MNC to engage them in a possible dialog. However, corporate diplomacy concepts must accept the current unwillingness of some stakeholders to engage in a dialog and adapt the strategies accordingly.

The threat of interference in business affairs from government, activists, and political parties is increasing on a global scale, which makes corporate diplomacy concepts necessary. The threat level brings classical concepts of public relations to obsolescence. A mere positive portrait of a company will be easily attacked, especially if the company operates in a scrutinized industry. Corporate diplomacy initiatives should concentrate on building long-term relationships with government contacts and civil servants and less on convincing unwanted stakeholders.

The network of contacts can be essential for corporate diplomacy. The network has to have a strategic design, with the requirement to identify the contact and the knowledge, how long the contact has existed, what influence the contact possesses, and which access to political information they have. Networks must extend to multiple countries and be in constant need of monitoring and maintenance, which could be integrated into the Due Diligence pillar of Henisz's concept.

Corporations cannot operate globally while being disengaged from their political and sociopolitical environment. It can build on the efforts of their corporate social responsibility programs. The change in stakeholder behavior and influence requires a constant evaluation of new concepts to integrate into corporate diplomacy. In conclusion, any international corporation should conduct corporate diplomacy.

Corporate diplomacy will therefore have a future in international management.

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DIGITAL LEADERSHIP: THE 21ST CENTURY LEADERSHIP STYLE

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ABSTRACT

As a process of digital transformation, the previous, classic leadership competencies were supplemented with new ones, and a new leadership style, the digital leadership emerged. What was considered an advantage a few years ago is now a basic requirement. Technology can no longer be seen as just a tool. A digital leader must ensure that technology is a central element of the strategy. This paper examines this area from the perspective of leadership competencies and emerging challenges. Objectives of this study were to analyse digital leadership as a leadership style, and to investigate the connection between classical and digital leadership skills. At the same time the main challenges - employees and leaders face - have been also examined. Results: In this research it was determined that digital leadership exists beside the classic and modern leadership styles and it complements them. Strong relation has been found between classical and digital leadership skills. It was observed that employees in leadership roles tend to view their own superiors more favourably than employees without subordinates. Finally, the main challenges that employees and leaders face in the workplace due to digital transformation were summarised. Conclusion: The acceleration of technological development and the rise of digitization have brought humanity into a constantly changing world, posing unprecedented challenges for all of us. For managers, this may require new skills, or a different application of traditional leadership competencies, which now carry a different weight in the digital age.
Keywords: challenges of digital age, digital leadership, digital transformation, leadership competencies

INTRODUCTION

As a result of digital transformation, revolutionary changes have occurred in the global economy, significantly impacting the human dimension, including the roles and operations of management and leadership.

In the second half of the 20th century, the emergence of semiconductors, computers, and the internet (Industry 3.0) sparked a wave of innovation that, when combined with the breakthroughs of the Fourth Industrial Revolution - such as intelligent technologies and artificial intelligence - has profoundly transformed the economy and every aspect of human life.

As SAP highlights in its newsletter (*SAP Insights,* 2022), while the first four industrial revolutions were driven by the discovery of new technologies, the developing Fifth Industrial Revolution (Industry 5.0) focuses more on the evolution of existing technologies (primarily those of Industry 4.0) and emphasizes the synergy between technology and the human element. It represents the enhanced collaboration between humans and robots, prioritizing a human-focused, sustainable, and resilient industrial environment.

Although there is frequent discourse suggesting that the digital age is leading to the mechanization of life and the domination of technology over humans, the reality is that people remain one of the central pillars of current developments, especially in Industry 5.0. From a business perspective, this involves attracting, developing, and retaining talent, as well as fostering a progressive work environment and processes that drive employee efficiency and commitment. Leaders continue to play a cardinal role in this transformation. Through digital transformation, traditional management competencies have been expanded, giving rise to a new management style: to the digital leadership.

By searching for the term 'digital leadership' in the 'Web of Science' database and filtering it to the European articles from the last ten years, it has been found that 82.95% of publications were written between 2021 and 2025, which fact itself supports the timeliness of the topic.

This study aims to examine the existing literature on digital leadership with the objective of determining whether it represents a distinct leadership style or functions as a complementary dimension alongside classical and modern model, emerging as a response to digital transformation. Since there is no universally accepted definition, the research seeks to synthesize the various approaches that have appeared in the topic. An additional goal is to add to the academic discourse by bringing the various researches on digital leadership skills into a unified conceptual framework. By synthesizing the different studies, the research intends to provide a more structured picture of what digital leadership competence actually means. This holistic approach can serve as a starting point for future empirical research and the further development of measurement tools in this area. Understanding and developing these competencies are essential not only for organisation success and sustainable performance, but also for maintaining the mental health of leaders. The primary research focuses on evaluating employees' perceptions of their leaders' classical and digital leadership competencies with the aim of identifying potential correlations between the two and assessing the strength of these relationships. This approach allows for either the reinforcement or re-evaluation of the conclusions of existing studies in the topic. Furthermore, the study aims to identify the primary challenge employees face in the workplace as a result of digital transformation.

LITERATURE REVIEW

Digital Transformation

The acceleration of technological development and the rise of digitalization have brought a constantly changing world to humanity, which presents all of us with unprecedented challenges. Both as professionals and as individuals, we need a kind of lifelong learning, as well as a high degree of flexibility and adaptability (*Kőmüves* *et al.,* 2022). Not only we have to adapt ourselves to the digital transformation, but we also have to deal properly with the fact that it does not work in the same way in all areas and not for everyone. As individuals, many characteristics can influence our ability to adapt to digital transformation, such as generational differences or general awareness. In the same way, there are large differences in the corporate sector as well. Technology, IT and communication companies are obviously key players in the digital transformation process, while e.g. the construction industry is slower to catch up with other players in the economy in terms of digital development. (*Zulu et al.,* 2023).

The presence of technology alone does not guarantee that companies will achieve their goals during digital transformation processes. The biggest challenge is not the introduction and application of technology, but the general attitude and perspective of companies, as well as corporate culture and other characteristics of the organisations that enable the successful participation in digital transformation processes. That is why it is important to highlight the role of the digital leader, who steers the corporate culture in the right direction and conveys the company's vision (*Türk,* 2023).

However, as a leader, new skills may be needed, or the existing, so-called classic leadership skills can bring success to the digital leader with a different weight. However, for a deeper understanding of the topic, it is necessary to examine and define the concept of digital management itself at first.

Concept of Digital Leadership

Owing to the digitization, companies have set many new goals, such as error-free manufacturing capabilities. When digitization left the production structures and became a structure characteristic of the entire company, this process necessarily results the development of digital management. (*Oktaysoy et al.,* 2022).

According to German researchers (*Claassen et al.,* 2021, 2023), the literature does not uniformly define what digital leadership is. The related definitions are not consistent, and shifts in emphasis can also be observed in this subject. However, they emphasize the comprehensive work of *Chaiyaset Promsri* (2019), whose research collected 64 characteristics of the digital leader from the named sources, and then narrowed all these characteristics down to six equally emphasized main elements.

The first characteristic is digital knowledge: knowledge of the changes caused by digitization and the possibilities inherent in it. The next characteristic is the vision, which means clear objectives related to digital transformation processes. The third characteristic is customer focus: taking into account the needs of our partners regarding digital processes. Next is agility, which is the ability to move skilfully in the digital space and adapt to rapidly changing processes. This is followed by risk taking. Promsri approaches this characteristic by saying that the digital leader must be able to create a kind of experimental atmosphere in the digital age. In addition, leaders need to develop a culture of constructive criticism, because this can ensure that we test what we are capable of and participate in the processes with an innovative approach. The last characteristic is the strengthening of cooperation and teamwork between colleagues.

Claassen and his research collaborators - also using the work of Promsri - applied and validated a seven-item measurement tool (DigiFuehr) suitable for analysing digital leadership competencies, involving 546 municipal employees in their research, who use virtual workstations. The results of this were compared to the results of a previously created scale for measuring a classical leadership style (ClassicFuehr), also consisting of seven elements (*Claassen et al.,* 2021, 2023).

They were able to demonstrate a moderate correlation between the two scales, from which they came to the conclusion that a new type of – digital – managerial competence will be necessary for the 2020s.

A study from 2019 states (*Dimitriadi,* 2019) that digital leadership is not necessarily different from leadership in terms of managing different interactions and promoting innovation. At the same time, for leaders, the term "digital" should draw attention to the fact that the digital leader must understand the possibilities of the relationship between human and non-human participants in the problem-solving process.

A Greek study (*Antonopoulou et al.,* 2021) examined the relationship between the digital leadership style, that exists in parallel with modern leadership styles among managers working in Greek higher education. In their own model, they described that a strategic leader with business and digital knowledge is considered a digital leader. It was shown that the transformational leadership style has a significant positive effect on digital leadership among the transformational and transactional leadership styles. Also, the more effective a leader is, and the stronger the satisfaction with him/her, the more effective his/her digital leadership practice is.

In connection with the discussion of the digital leader, the concept of digital maturity should also be mentioned. This is the company's willingness to change and its ability to apply new, innovative technologies in line with trends (*Eremina et al.,* 2019). A research involving 1,821 Croatian small and medium-sized enterprises (*Kokot et al.,* 2023) concluded that while digital management is characteristic of 92% of the companies, digital maturity presents to a much more modest extent. 16% of digital leaders are sceptical about digital processes and their importance. 22% of leaders try to adapt their leadership style to digital processes, 39% of them work well in the digital environment, and only 16% of digital leaders can really achieve outstanding results by exploiting the opportunities of digital transformation.

According to our approach, digital leadership is a leadership style that was developed as a result of the digital transformation, and which represented a competitive advantage in the early days of the digital age, but for now it has become a basic condition for successful leadership. As a management style, it appears parallel to classical and modern styles in managerial work and characteristics and also complements them. And it requires new skills and competencies, as well as a strategic approach, from the digital leader.

Following the conceptual examination of digital leadership it is appropriate to examine the specific skill and competencies associated with the term.

Digital Leadership Skills

While there have been many studies on leadership skills, there is little research on the skills of digital leaders. Has the skillset that companies expect from the managers changed? What are the skills that have increased in value and received more emphasis from the point of view of the management process as a result of the digital transformation?

One of the basic skills that characterizes a digital leader is digital awareness (digital literacy). In practice, this means that a digital leader is able to make decision about which technology should be used in a given situation, based on the needs and the digital practices already in use. (*Newland & Handley,* 2016)

A recent research (*Philip et al.,* 2023), with the involvement of senior managers, aimed to identify the most important management skills in the age of digital transformation. The experts collected 39 skills and agreed that the most important ones for the successful management of digital transformation are: foresight, agility, data analysis ability, data-driven decision-making, strategic thinking and change tolerance. They pointed out that all these skills are important to a different level in different industries and cultures. Digital thinking is a critical skill in a technology company, while it plays a lesser role in medicine, and behavioural skills are more prominent in the consulting industry than in other fields. Philip and his colleagues set an important goal with their research, however, it involved only eighteen participants and introduced a rather opaque system for defining the skills expected of digital leaders.

So far, there have been few publications not only on digital leadership skills, but also on digital leadership competencies. There is also a lack of a scale that can be used to measure digital leadership competencies, which prevents the understanding of these characteristics, as well as their underlying mechanisms and consequences. The existing tools are at an initial stage, waiting for further development and validation. In addition, it can be assumed that a leader can effectively deal with the challenges of digital transformation in three ways: by means of "digital interactions", "digital openness" and "digital example setting" (*op´ t Roodt et al.,* 2024).

Competence can be interpreted as the interaction of skills, knowledge and attitudes (*Baartman & De Bruijn,* 2011).

Based on the above three studies, *Table 1* presents the competencies of digital managers.

Table 1: Digital Management Competencies

SKILL	KNOWLEDGE	ATTITUDE
Foresight	Digital literacy	Digital interaction
Agility		Digital openness
Data analysis		Digital setting as example
Data-driven decision making		
Strategic thinking		
Change tolerance		

This list is complemented by the statement of *Tagscherer and Carbon* (2024) that in addition to business strategic leadership, people leadership should not be ignored. According to them 'On the one hand, a strategic decision-making process neglecting customer or market needs or lacking a comprehensive business understanding could steer companies in the wrong direction. On the other hand, missing out on the people's perspective and neglecting the importance of change management harms employee motivation and, thus, companies' performance within digital servitization'.

The importance of people leadership is supported by a Dutch study (*Henderikx & Stoffers,* 2023**)**, which examined the leadership behaviour of middle managers related to digital transformation. According to the respondents' ratings, the most important skills were integrity, trust, and empowering people. They found that soft skills that facilitate people-oriented interactions (e.g. empathy, clear communication, adaptability, flexibility, etc.) are key to managing change, driving innovation, and successfully leading digital initiatives.

A practical framework for digital leadership competencies was established by the Norwegian-Danish Müller and co-authors (*Müller et al.,* 2024). They argue that the necessary leadership competencies depend on the goals of the digital transformation (e.g. flexible or stable operation, internal or external orientation). Based on this, four archetypal leadership competency portfolios were identified (*Figure 1*.). The authors therefore state that digital transformation is not a uniform phenomenon, but a diverse process that requires different leadership competencies, depending on the organisational situation, goals and technological challenges. The competency portfolio framework helps companies identify gaps between the leadership skills needed for digital transformation and the skills they already have. It can be used to plan leadership development or selection, make digital strategies, and identify leadership profiles that best match the organisation's digital maturity. It also supports the ongoing rethinking of leadership competencies across different phases and challenges of digital transformation.

Figure 1: Digital Transformation Leadership: Archetypical Competency Portfolios

Source: *Müller et al*., 2024, p. 3

Having examined and attempted to synthesize the competencies of digital leadership, the focus now shifts to the challenges faced in digital management.

Challenges of Digital Management

While recent literature increasingly addresses the topic of digital leadership, relatively little research has been found concerning the leadership challenges of digital transformation and the potential solutions or responses to these challenges.

One of the difficulties faced by a digital leader during digital transformation is the fact that the process of digital transformation is much less recognizable than economic processes. It takes unpredictable turns, when platforms, digital processes and devices supplant each other even from one month to the next, and modern solutions become obsolete in a short time. *Kőműves et al.* (2024) stated that automation may lead to an even greater burden on employees and on leaders as well. There is a demand for continual headcount decrease, but savings achievable through more efficient processes are often overestimated.

It is equally challenging that during the digital transformation, the participants in the process must acquire a kind of digital knowledge. However, for many of them, all of this is like learning a new profession in addition to the existing one.

It can be admitted that it may be less challenging for an IT or a telecommunications specialist to keep up with digital transformation processes than for a doctor or an artist. As a result of the above, the digital leader can easily encounter external (coming from his/her team), but also internal (personal) resistance at the same time. Organizational culture, work and group processes do not necessarily follow flexibly the events of digital transformation. The digital leader has to make efforts to increase his/her team's adaptability and openness towards digital transformation processes.

Examining the relationship between digital leadership and psychological well-being in an British-German research (*Zeike et al.,* 2019), the results of previous publications were summarized and it was formulated that it is very important for a digital leader to make his/her digital competencies strengthened to successfully cope with the challenges of digital transformation. Otherwise, challenges increased by the digital transformation negatively affect their personal well-being and increase the chance of burnout. In their own research, *Zeike et al.* involved 368 managers and they were able to demonstrate that there is a relationship between digital leadership competencies and the psychological well-being of top-level managers. People with lower digital leadership competencies are more likely to have lower levels of psychological well-being.

All this suggests that the digital transformation itself exposes managers to increased stress, and the successful management of digital transformation processes requires the existence of new types of digital skills. If the manager does not have this, it is expected to have a negative impact on her personal and psychological well-being. Thus, the development of digital competences cannot be left out of the management development process.

The following four recent studies conducted in different countries and focusing on the subject examine the consequences of digital transformation from different approaches. However, they all highlight that technological innovations alone are not enough for successful digital operations. These researches all point out that adapting to the digital environment primarily poses human and organizational challenges, not technical ones: the biggest tasks are leadership attitude, the development of employee skills, strengthening team cohesion, and adapting to new forms of work.

The aim of the Latvian-Lithuanian-German research (*Toleikienė et al.,* 2024) was to identify the key challenges of e-leadership (digital leadership) in municipalities in the post-pandemic period. According to the focus group studies, there are differences in remote work practices across countries, but several common challenges can also be observed. According to their findings, striking the right balance in communication, supporting employees, strengthening team spirit, and establishing fair practices regarding remote work are of particular importance.

The Swedish study (*Vallo & Byströmm,* 2021) also highlights that the development of digital workplaces presents not only technological but also social and leadership-related challenges. It emphasizes two key areas: the need for everyday learning practice to acquire new skills, and the necessity of adapting leadership approaches to the digital environment. The COVID-19 pandemic has made these issues even more relevant, as digital work has, in many cases, become a permanent practice. The study points out that the digital workplace is not just a technological change, but also a profound organizational and human transformation.

Another Swedish paper (*Babapour et al.,* 2022) argues that the new forms of work offer both opportunities and challenges for employees, managers and organisations. One of the biggest challenges of remote work is the lack of social aspects of work, so the offices of the future are expected to be more about building relationships, collaboration and strengthening a shared culture. Employees and managers will need to learn new skills for hybrid working, while organisations will need to consider social and environmental sustainability and redesign physical and digital workplaces.

The main goal of the Turkish study (*Kübra et al.*, 2023) is to reveal the foresight of managers in the Turkish white goods industry regarding the advantages and challenges of Industry 4.0 (I40) and compare them with the literature. They discovered that 28 studies focused directly on I40's advantages and challenges. They listed the advantages and challenges provided in these 28 studies, which list shows that the most frequently recurring I40 challenges are employee qualification (13%), technical challenges (12%), strategy/competition (10%), cyber security (10%) and financial challenges (9%). These five categories constitute more than half of all challenges mentioned by the literature.

Following a comprehensive review of the relevant literature, the subsequent section presents the research conducted in the current study.

MATERIALS AND METHODS

A mixed-method, anonymous online survey was conducted to collect both qualitative and quantitative data. The primary research reached a total of 141 employed individuals, who have direct superiors at their workplaces. The questionnaire was made available in both English and Hungarian to ensure accessibility. To assess leadership competencies, the validated ClassicFuehr scale with 7 questions and the validated DigiFuehr 2.0 scale with 9 questions (*Claassen et al.,* 2021, 2023) were employed. To evaluate the challenges of digital transformation, open-ended questions were included, that allowed for free-text responses. Google Forms application was used to distribute the questionnaire, and the results were analysed using Microsoft Excel and R software.

Demographic background of study population

A total of 141 individuals completed the questionnaire, of which 39 were male (27.66%) and 102 were female (72.34%) (*Table 2*).

Table 2: Respondents' gender

Gender	Number of respondents	Distribution of respondents
Man	39	27.66%
Woman	102	72.34%
Total	**141**	**100.00%**

Nearly half of the respondents, 70 individuals (49.65%), fell within the 40–49 age group, while close to one-third, 45 individuals (31.91%), were in the 30–39 age group (*Table 3*).

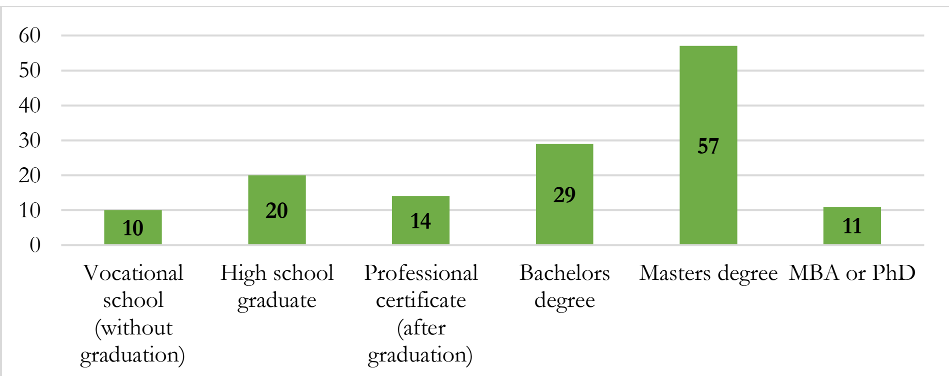
Table 3: Respondents' age

Age (years)	Number of respondents	Distribution of respondents
20–29	7	4.96%
30–39	45	31.91%
40–49	70	49.65%
50–59	17	12.06%
60–65	2	1.42%
Total	**141**	**100.00%**

Among the participants, 93.62% (132 individuals) live and work in Hungary, while additional 7 individuals are based in other countries in Europe, 1 in Asia, and 1 in Australia.

Approximately one-quarter of the respondents, 34 individuals (24.11%), have completed secondary education without a higher education degree, while more than two-thirds, a total of 97 individuals (68.79%), hold a college or university degree (*Figure 2*).

Figure 2: Respondents' education



Limitations and potential biases

Although the study provides relevant insights into how employees perceive classical and digital leadership competencies, some methodological limitations must be acknowledged.

The sample size (N=141) limits the generalizability of the findings. While the demographic diversity of the sample in terms of age, gender, and educational background enhances representativeness, it is still relatively small compared to the broader working population, and does not allow for more nuanced subgroup analyses.

The sampling method relied on anonymous online distribution, which can introduce self-selection bias. Participants with a higher interest in the topic of leadership or those affected by digital transformation may have been more likely to respond, potentially skewing the results toward more engaged or reflective individuals.

The self-reported nature of the data introduces some common limitations, such as social desirability bias and subjectivity. Respondents may have rated their leaders either more favourably or critically based on personal feelings or recent experiences rather than an objective assessment of competencies. Moreover, leaders evaluating their own superiors might unconsciously project their own leadership views, experiences, or expectations onto them.

Additionally, while the ClassicFuehr and DigiFuehr 2.0 scales are validated tools, their translation and cultural adaptation – despite the process of involving professional linguists and back-translation – could result in interpretational variance across respondents.

Finally, while the mixed-method approach (quantitative scales + open-ended responses) adds depth, the qualitative part was not analyzed through a formal coding process (e.g., thematic analysis), which limits the analytical rigor of those responses.

Future studies could consider employing larger, randomized samples, gathering data from multiple sources (e.g., 360° feedback, peer assessments), and applying standardized qualitative methodologies to address these limitations and deepen the understanding of digital leadership in practice.

RESULTS AND DISCUSSION

Both the ClassicFuehr scale (which measures classic leadership competencies with its seven questions), and the DigiFuehr 2.0 scale (which measures digital leadership competencies with nine questions), were evaluated by respondents using a four-point Likert scale. A score of 1 indicated that the particular skill was not characteristic of the respondent's superior, while a score of 4 indicated that it was completely characteristic. A score of 2 meant "rather not characteristic," and a score of 3 indicated "rather characteristic."

Respondents assigned an average of 2.83 points out of a maximum of 4 to the ClassicFuehr questionnaire, while the DigiFuehr 2.0 questionnaire received an average score of 2.74 points. This does not indicate a significant difference between the two scales (0.09 points) (*Table 4*).

Table 4: Statistical evaluation of ClassicFuehr and DigiFuehr 2.0 leadership skills scales

Leadership skills scales	ClassicFuehr	DigiFuehr 2.0
Count	N=141	N=141
Range	R=3.00	R=3.00
Median	Me=2.86	Me=2.78
Mean	$\bar{X}$=2.83	$\bar{X}$=2.74
Standard Deviation	σ=0.78	σ=0.81

There is no major difference between men's and women's answers, although women assess their superior's digital leadership competencies somewhat more positively (*Table 5*).

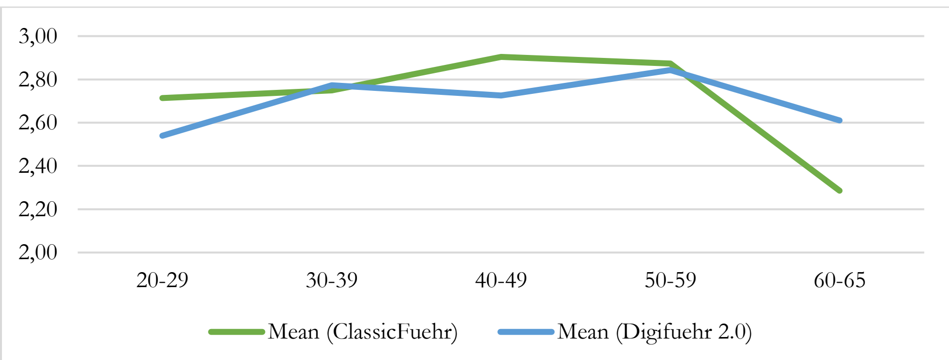
Table 5: Statistical calculation of the Mean, by genders.

Gender	Mean (ClassicFuehr)	Mean (DigiFuehr 2.0)	Count
Man	2.80	2.65	39
Woman	2.84	2.78	102
Total	**2.83**	**2.74**	**141**

It was examined, how the two scales correlate with each other. The Pearson correlation coefficient is between +0.7 and +1 (r=0.7329), indicating a strong relationship between the scales with unidirectional movement. A respondent who assesses their superior as possessing classic leadership competencies is likely to hold a similar view regarding their superior's digital leadership competencies. Conversely, a respondent who does not consider their superior to be a good leader based on classic leadership competencies is likely to have the same opinion regarding their superior's digital leadership competencies.

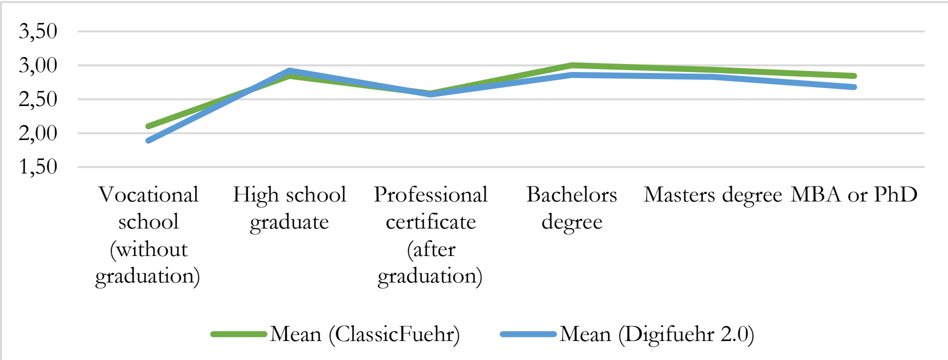
No significant difference can be detected in the opinions of respondents based on their age; however, recent graduates and individuals nearing retirement somewhat negatively assess the classic and digital leadership skills of their superiors (*Figure 3*).

Figure 3: Evaluation of classical and digital leadership skills by age of respondents



No significant difference can be identified based on the educational level of the respondents; however, it can be observed that those without a secondary education or higher tend to evaluate the classic and digital leadership skills of their superiors less positively (*Figure 4*).

Figure 4: Evaluation of classical and digital leadership skills by education of respondents

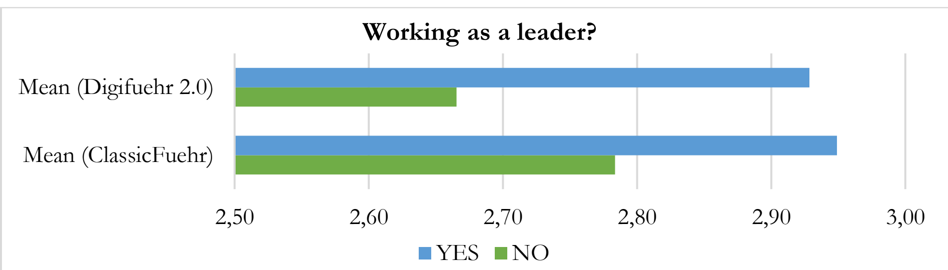


However, a difference can be observed between the responses of leaders and those of employees in subordinate roles. Leaders clearly evaluate their own superiors more positively, while employees without subordinates tend to do so more negatively (*Table 6* and *Figure 2*).

Table 6: Statistical calculation of the Mean, by leaders and subordinates.

Working as a leader	Mean (ClassicFuehr)	Mean (DigiFuehr 2.0)	Count
NO	2.78	2.67	99
YES	2.95	2.93	42
Total	**2.83**	**2.74**	**141**

Figure 5: Evaluation of classical and digital leadership skills by roles of respondents



Future researches could aim to investigate whether leaders rate their superiors more favourably because they themselves experience the challenges associated with leadership and digital transformation, or there are other reasons behind the above results.

In the current questionnaire, respondents had the opportunity to write a detailed explanation regarding their challenges at work as leaders or subordinates, due to digital transformation. The most frequently mentioned points of feedback~~s~~ are summarized in *Table 7*.

Table 7: Challenges at work due to digital transformation

As a team member or subordinate	As a leader or superior
Lack of information	Digital implementations without trainings
Lack of digital culture	Lack of interest of team members in learning
Unreliable tools	Increased employee stress level
More complex processes	Improper digital implementations
Less personal connection	Customer dissatisfaction

It is evident that during the digital transformation process, it is crucial to implement the appropriate applications effectively within the workflows, and ensure that employees receive the necessary training to utilize these tools. Furthermore, accepting the altered processes and being open to learning how to use the newly introduced applications is essential, as is embracing the changes in workplace processes brought about by digital transformation.

Implications

Digital transformation – following the technological advancements of the latter half of the 20th century – did not come as a surprise to humanity. However, it has introduced unexpected and unforeseen changes into our lives. People experience these changes both in their personal and professional lives, across nearly every field.

For companies, in the early stages of digital transformation and Industry 4.0 (during the last three decades of the 20th century), digital knowledge and the use of technological tools initially provided only a competitive advantage. Later, it became the key to success, and today, it has become a fundamental prerequisite for operation. This shift has also influenced leadership practices, giving rise to a new leadership style: digital leadership.

Digital leaders first had to acquire new types of skills. As a result of digital transformation, a new economic structure has emerged, requiring leaders to adopt different mind-set, attitude, and methods. This has placed significant pressure on leaders, and research now shows that leaders with higher levels of digital competencies also experience improvements in their personal or psychological well-being.

Digital transformation and digital leadership are relatively new topics in academic works. A significant portion of the research has been conducted in the last 10 years, and particularly in the last 5 years. As a result, there are still only a few studies and validated scales available that address the most common challenges, characteristics, and skills of digital leaders. However, based on existing literature, we can assert that digital leadership is now essential for all economic organizations, and its success, as well as the effective management of digital transformation challenges, requires continuous learning and leadership competence development.

Digital knowledge and the ability to navigate digital processes are expected to have a positive impact on management and employee psychological well-being, and ultimately, on the overall performance of the company.

CONCLUSIONS

This study was set out to examine the existing literature on digital leadership, to assess whether it represents a distinct and independent leadership style, or exists alongside classical and modern leadership styles, as a result of digital transformation. The literature suggests that digital leadership has evolved from being a competitive advantage to becoming a fundamental leadership requirement. It does not replace classical or modern leadership, but rather complements them by integrating new competencies essential for navigating organizations during the digital era.

During the primary research, the objective was to investigate the connection between classical and digital leadership skills and identify the main challenges respondents face during work due to digital transformation.

The empirical findings support a strong correlation between classical and digital leadership competencies. Leaders who are rated highly on traditional leadership skills also tend to score high on digital competencies, suggesting these dimensions are closely intertwined. At the same time, no significant differences were observed based on gender, age, or education. However, individuals in leadership positions evaluated their superiors more favourably, likely due to shared experiences and a deeper understanding of leadership challenges in digital contexts.

Qualitative responses revealed that both employees and leaders face obstacles related to digital transformation. For employees, these include lack of information, weak digital culture, and reduced personal interactions. Leaders, in turn, report insufficient training, low team engagement in digital upskilling, increased stress levels and customer dissatisfaction. These findings highlight the dual challenge of implementing effective digital tools while building a workplace culture open to transformation.

Based on the evolving nature of digital leadership, there are several opportunities for future research:

Longitudinal or experimental studies to explore causality between digital leadership competencies and organizational outcomes, such as employee engagement, retention, and psychological well-being.

Future studies from larger, more diverse populations across industries and countries to enhance generalizability and enable subgroup analyses (e.g., generational or cultural effects).

Applying structured qualitative methods (e.g., thematic analysis) to open-ended responses would result deeper insight into the human aspects of digital leadership transitions.

Testing leadership development programs focused on digital competencies would help to identify effective methods for preparing current and future leaders.

Ultimately, the integration of classical and digital leadership appears to be not only complementary but mutually reinforcing. Ensuring that leaders possess both skill sets – and are supported in developing them – may help in maintaining resilient and adaptive organizations in the digital age.

ACKNOWLEDGEMENT

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SUSTAINABILITY CHALLENGES IN OMNI-CHANNEL RETAILING: A SYSTEMATIC REVIEW

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ABSTRACT

The consideration of sustainability aspects in omni-channel retail research has increased in recent years. Nevertheless, the literature lacks structured reviews that provide a holistic view on the various challenges in this research field. The purpose of this systematic review was to identify and structure the current sustainability challenges in omni-channel retailing. This review was conducted in accordance with the PRISMA statement guidelines and examined publications from 2012 to 2022. The bibliographic databases ScienceDirect, Emerald Insight and Scopus were used for the review. The examination of 10 publications from 663 records revealed a diversity of sustainability challenges in omni-channel retailing covering all three dimensions of sustainability. However, the review indicated an uneven weighting in favour of economic challenges, followed by environmental, while social aspects were of minor interest. Along the value chain, challenges in transport and logistics were especially in the spotlight in omni-channel research. This review is the first to highlight sustainability challenges documented the academic literature on omni-channel retailing and attempts to offer a comprehensive, and structured overview as a starting point for future research or for development of managerial implications in business practice.
Keywords: retailing strategy; sustainable development, consumer behaviour, PRISMA, classification

INTRODUCTION

Background

Advances in digital technologies have transformed sales channels (*Verhoef et al.*, 2021). Omni-channel has become the new standard in retail (*Chen et al.*, 2018; *Cocco & De-Juan-Vigaray*, 2022; *Verhoef et al.*, 2015). This development has been further accelerated by the impact of the COVID-19 pandemic (*Timotius & Octavius*, 2021; *Verhoef*, 2021; *Zhang & Hänninen*, 2022). In omni-channel retailing, the individual sales and communication channels are merged with each other (*Cummins et al.*, 2016). This ensures a consistent, channel-overlapping customer approach (*Cai & Lo*, 2020; *Verhoef et al.*, 2015). The high degree of channel integration enhances the shopping experience (*Lemon & Verhoef*, 2016). However, it is highly complex at different levels from the corporate perspective (*Dirsehan*, 2020). Major challenges for companies are channel integration and linkage, channel management, data analytics and understanding cross-channel customer behaviour (*Briel*, 2018; *Mirzabeiki & Saghiri*, 2020; *Simone & Sabbadin*, 2017; *Ye et al.*, 2018). Furthermore, sustainability aspects in the context of omni-channel retailing are of growing importance. The impact of climate change is not only one of the most urgent contemporary challenges for society and politics (*Werners et al.*, 2013), but also for companies (*Cai & Choi*, 2021). Retailers in the rising field of omni-channel are particularly affected by this development because the nature of the cross-channel business model includes a variety of sustainability-related aspects due to the different digital and physical touchpoints and processes (*Sousa et al.*, 2021). A wide range of corporate activities along the entire value chain is concerned (*Adivar et al.*, 2019). Examples of the spectrum of sustainability challenges in omni-channel retailing include e-commerce logistics, with its ecological footprint, returns management and the use of eco-friendly materials from a corporate perspective or the increasing environmental awareness of consumers (*Bălan*, 2021; *Sousa et al.*, 2021).

The concept of sustainability encompasses the careful of (natural) resources (*Barbier*, 1987). The use of the term in this article is based on the common assumption that sustainability can only be realised through the simultaneous consideration of economy, ecology and social aspects (*Barbier*, 1987; *Hansmann et al.*, 2012; *Kaklauskas & Kaklauskiene*, 2022; *Purvis et al.*, 2019). These three dimensions are known as the triple bottom line (*Kleindorfer et al.*, 2005). In the literature on sustainability challenges, there are common overlaps and blurred boundaries between the different dimensions. A dominant research focus on the ecological challenges in omni-channel retailing is the scientific examination of logistics (*Giuffrida et al.*, 2019a; *Melacini & Tappia*, 2018; *Muñoz-Villamizar et al.*, 2021). Although omni-channel retailing allows the customer to choose between different sales channels (e.g., web shop, in-store, click & collect or ship-from-store), the transport of goods, regardless of the delivery or collection option, is in all cases accompanied by CO2 emissions (*Buldeo Rai*, 2021). Studies conclude that direct delivery of goods in omni-channel retailing is usually more environmentally friendly than shop pick-up, but only if ambiguous factors such as excessive packaging waste or possible returns are not taken into account (*Bertram & Chi*, 2018; *Escursell et al.*, 2021). According to *Giuffrida et al.* (2019b), the most critical factor influencing sustainability, whether direct shipping or click & collect is more environmentally efficient, depends on the distance between the customer's home and the retail shop.

Omni-channel retailers, however, are not the only parties that affect environmental impact. The carbon footprint is also determined by consumer behaviour (*Buldeo Rai*, 2021). Studies indicate that customer awareness in terms of sustainability has grown, in particular with the advent of the COVID-19 pandemic (*Bălan*, 2021; *Koleva & Chankov*, 2022; *Švecová et al.*, 2020). For example, *Bălan* (2021) or *Koleva & Chankov* (2022) or *Švecová et al.*, (2020) demonstrate a strong scientific interest in understanding enhanced customer awareness and sustainability-related purchasing behaviour.

However, even if the above authors' studies represent an enlightening contribution to omni-channel research on sustainability challenges, only one partial aspect is taken into account (consumer behaviour). Approached from the corporate perspective, studies imply that the challenge of increasing consumer awareness towards greater sustainability can be addressed with more transparency and honest green marketing initiatives (no green washing) (*Harris et al.*, 2016; *Arora*, 2019; *Nguyen & Johnson*, 2020; *Young et al.*, 2009). However, such initiatives by retailers are only credible if the preconditions in terms of sustainability, e.g. through more sustainable products or business processes, are met (*Wiese et al.*, 2015). The term "challenge" as used in the context of this review is based on the economic definition of a difficult task, condition, situation or aspect, characterised by high demands.

Gap in knowledge and objectives of the review

The increasing number of scientific publications reflect a growing interest in omni-channel retailing from a sustainability point of view. However, structured summaries to provide an overall view on the various aspects of sustainability are lacking in this field of research. The extant literature addresses the different challenges (e.g., transport, customer behaviour). In attempting to fill this gap, this paper systematically reviews the relevant literature to identify the current sustainability challenges in omni-channel retailing. With the help of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist, this review provides a comprehensive overview of sustainability-related challenges in omni-channel retailing. Other objectives of this review are to categorise the individual challenges from a business perspective and to analyse and evaluate the screened studies, with the aim of informing future research areas and directions. In addition, the review establishes the most frequently discussed sustainability dimensions and their specific challenges, as well as the most challenging part of the supply chain.

Layout of the review

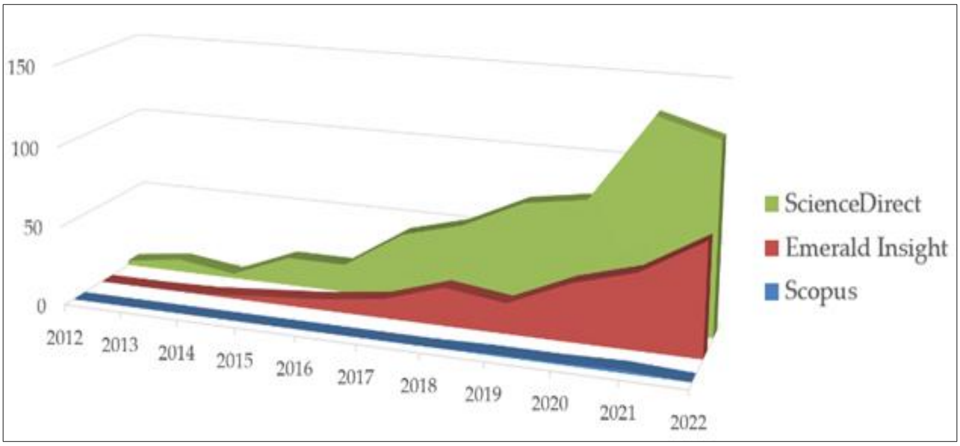
Following this introductory section, the subsequent sections give details of the method used in this review, the review process, results and discussion, limitations of the review, and finally conclusion and future directions.

METHOD

Databases Searched

This systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (*Moher et al.*, 2009; *Page et al.*, 2021). *Scopus, ScienceDirect* and *Emerald Insight* databases were accessed to search for articles published in journals, primarily in the fields of retailing, e-commerce, distribution and transport. The search was conducted on 25th January, 2023. The search period was limited to the period from January 2012 to December 2022. The title, abstracts, names of authors and journals, and years of publication were exported to an *Microsoft Excel* spreadsheet (*Figure 1*).

Figure 1: Increasing numbers of publications in omni-channel retail with sustainability context on ScienceDirect, Scopus and Emerald Insight



Search string: TITLE-ABS- (sustainability AND omni-channel retailing OR omni-channel retail AND consumer)

Eligibility Criteria

To be included in the study, the published articles had to meet the pre-defined criteria. The selection criteria stated that the articles should be available in full length and published in English language (*Figure 2*). Moreover, only review articles, research articles and conference papers were to be selected. Thus, publications in books, book series and as chapters in books were excluded.

Figure 2: Eligibility criteria

Design

- Availability in full length
- Published in the English language
- Only review articles, research articles and conference proceedings
- No inclusion of books, book series and chapters in books

Search String

sustainability
AND
omni-channel retailing OR omni-channel retail
AND
consumer

REVIEW PROCESS

Information Sources

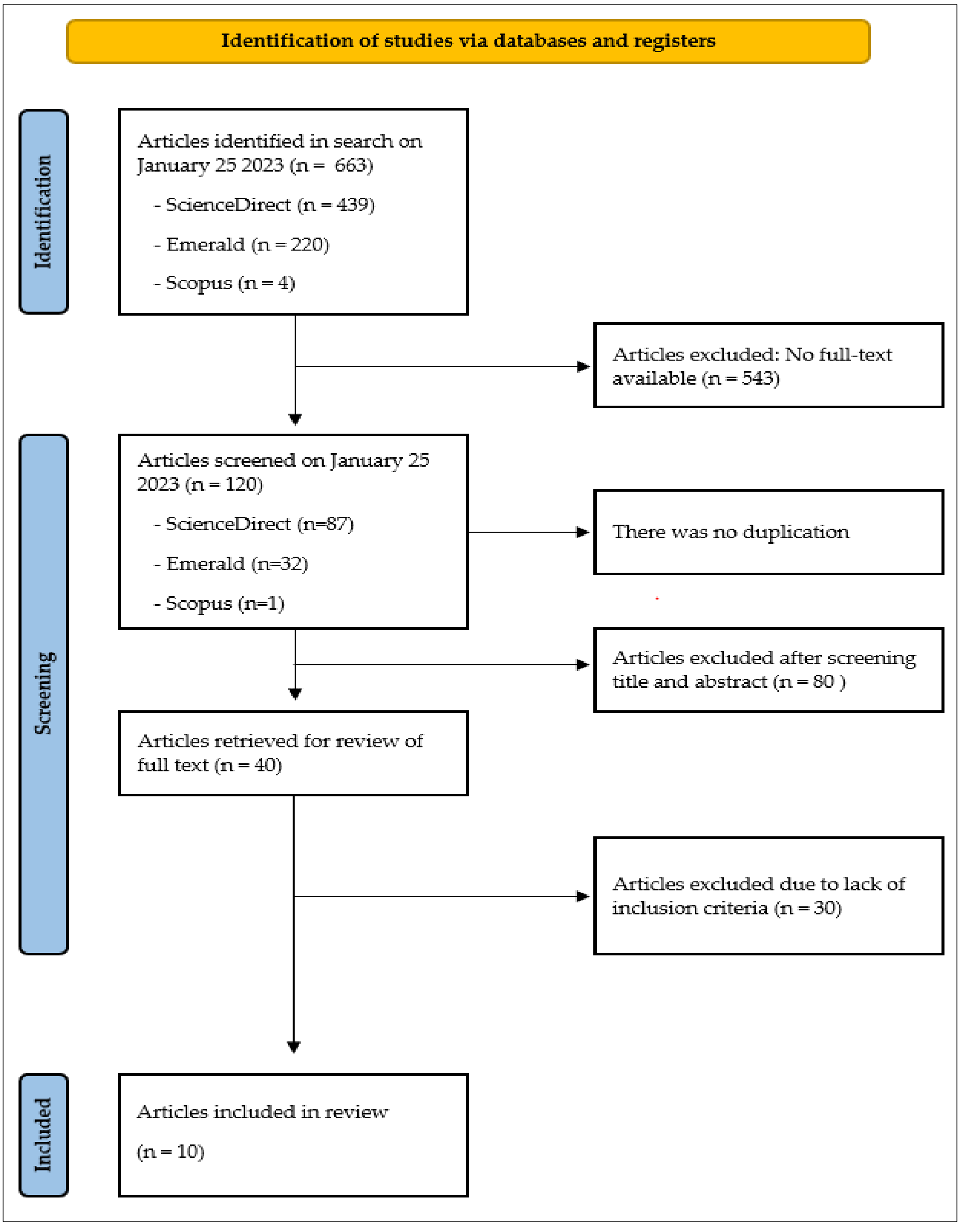
A comprehensive search was conducted on 25 January 2023 in three databases: *ScienceDirect*, *Emerald Insight* and *Scopus*. Using Boolean operators, the search string "sustainability AND omni-channel retailing OR omni-channel retail AND consumer" was produced. The title, abstract and keywords of the articles were considered in the search. Because the search was about "sustainability" in the context of "omni-channel retailing", both terms were included in the search string. In addition, the search term "consumer" was added to also cover the social and customer dimension in the search. Meanwhile, the search term "omni-channel retailing" has a more ecological-economical connotation. Hence, all three dimensions of sustainability were covered in the search string.

Study Selection

The selection of the identified studies was based on the PRISMA flow diagram (Page et al, 2021). First, the identified studies from the different databases were recorded in *CITAVI* and then exported cumulatively to an *Excel* spreadsheet. The dataset included basic information such as author(s) name, publication year, title or journal name. Subsequently, the articles were selected on the basis of the pre-defined eligibility criteria. If an article was initially screened successfully, the full text of the paper was evaluated and information about research-related topics, methods or the author(s) were recorded. Thereafter, the extracted articles were carefully read and recorded in an *Excel* spreadsheet containing, for instance, information on the author's name, year of publication, title of the article, journal name, digital object identifier (DOI), and main findings about challenges or databases (*Figure 3*).

Applying the search string, a total of 663 records were identified in the databases (*Figure 4*). The filter function for the study period of articles published from 2012 to 2022 and the classification of the article type had already been considered in the initial search. Despite unrestricted access to databases with the university library log-in data, only 120 articles were available in full-length. Therefore, 543 records had to be excluded. In a further screening process, the selection was made with the help of the four-phase flow diagram. Despite articles being drawn from different data sources, there were no duplicates. The remaining full-length articles were read thoroughly to determine their suitability. Because they were not related to the research question, 80 and later 30 additional articles were excluded. For example, in some articles no relation between the terms "omni-channel retail" and "sustainability" could be identified, but as keywords of the search string they were nevertheless in the text without any reference in the content. By the end of the screening, a total of 10 publications were included in this systematic literature review. Due to this low number of papers, further meta-analysis could not be applied.

Figure 3 Flow chart of study selection process



RESULTS AND DISCUSSION

Methods Employed and Characteristics of the Reviewed Studies

The main characteristics of the reviewed studies are summarised in *Table 2*. Although the survey included publications from January 2012 to December 2022, the final records had only been published in the last five years with five publications appearing within the last two years. Research in the retail or sustainability or computer science journals, as well as management and business journals, was mainly conducted in Europe (5 of 10), but data sets were also analysed in an international context (4 of 10) and in South America (1 of 10). The methodology of the reviewed studies was primarily qualitative in its approach~~es~~, but these could be divided into three main groups.

The main group consisted of seven articles that employed qualitative methods. Literature reviews are useful to categorise literature and analyse research agendas (*Durach et al.*, 2021; *Rowley & Slack*, 2004) as well as to identify gaps – or challenges as in this study. A (qualitative) literature review is conducted in two publications (*Adivar et al.*, 2019; *Bijmolt et al.*, 2021). A qualitative approach also appeared in other articles that used (descriptive) case studies (*Bilińska-Reformat & Dewalska-Opitek*, 2021), including multi-case analyses (*Kembro & Norrman*, 2019; *Mkansi & Nsakanda*, 2021), for example in combination with an interview and the Delphi study (*Kayikci*, 2018). Two papers in the second group are based on quantitative methods. *Pan et al.* (2017) conducted a two-stage data-driven experimental study and *Muñoz-Villamizar et al.* (2021) employed a discrete-event simulation model. In one article, the researchers combined qualitative and quantitative methods to address the research question. Based on an interview on company characteristics, *Risberg & Jafari* (2022) developed a framework for a quantitative study.

Sustainability Dimensions Studied

It is noteworthy from how many different perspectives and research directions the sustainability challenges can be viewed. Nevertheless, the examined studies have in common a strong company-related perspective. Such a weighting towards corporate-centric considerations of challenges in omni-channel research is also confirmed in other literature reviews in this field (*Olsson et al.*, 2019). The economic-corporate view in this study is also reflected in the coverage of the different sustainability dimensions. Even if all three sustainability dimensions are addressed, the review of the articles indicates a slightly uneven weighting (see *Table 1* and *Table 2*) in favour of the economic dimension (17 of 32), followed by an environmental dimension (10 of 32), and lastly social dimension aspects (5 of 32) (*Figure 4*).

Figure 4: Weighting of the sustainability dimensions (number of mentions)

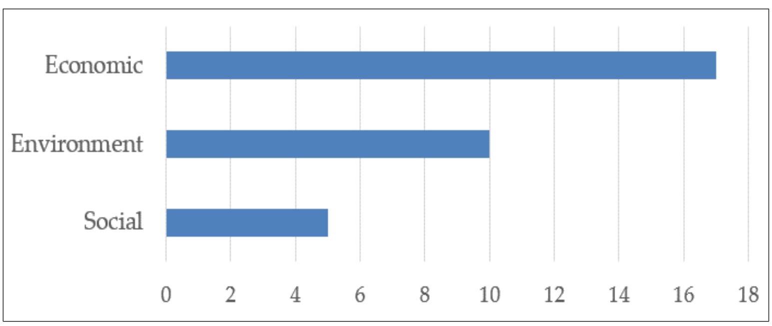


Table 1: Study characteristics and key findings

Study	Research field (of the journal)	Region	Challenges/Key Findings			Subject	Method
			Environment	Economic	Social		
Adivar et al. 2019	Retail, Distribution	internati-onal	Power consumption, packaging waste	Operational efficiency (e.g., eco-driving drivers, sustainable energy) Transport/logistics: using recycled or reused materials and packaging; distance between product origin, and destination, transport emissions, local supplier	-	Analysis of omni-channel retail supply chains based on the four performance indicators sustainability, efficiency, effectiveness and responsiveness	Literature Review
Bijmolt et al. 2021	Management and Business	internati-onal	Returns generate more waste and energy resources	Non-sustainable transports (i.e., last-mile) more cost-intensive	Last-mile key role for customer satisfaction (speed vs. sustainability)	Challenges for retailers that arise from external (consumer) as well as internal (operational) interdependencies.	Literature Review
Bilińska-Reformat & Dewalska-Opitek 2021	Computer Science	internati-onal	Environmental impact of the clothing industry	Reduction of the carbon footprint in fast fashion	Sustainability is only seen as a subordinate key factor for brand selection in fast fashion from the customer's point of view. But enhanced consumer awareness in relation to the social dimension (employment rights).	Challenges of the fast fashion industry during the Corona pandemic	Descriptive case study
Halldórsson & Wehner 2020	Transportation Business and Management	Sweden	High energy demand on the last mile of goods transport	Delivering goods collectively down in the supply chain as close as possible to the point of consumption	-	Challenge of high energy demand on the last mile of goods transport.	Explorative interview study
Kayikci 2018	Sustainability	Turkey	Resource efficiency, waste, pollution, land use impact	Costs, delivery time, delay, inventory, reliability	Health (disease caused by transport side effect like pollution or noise or accident rates)	Digitalisation of logis-tics processes makes it easier for companies to overcome sustaina-bility challenges	Case study (Interview, delphy study)

Kembro & Norrman 2019	Retail, Distribution	Sweden	Omni-channel retail executives still pay too little attention to sustainability aspects.	Decentralized omni-channel networks can help to improve sustainability when allocating the shipping location. Growing environmental awareness in management, nevertheless currently only of low relevance.	-	Challenges of logistics information systems from the perspective of Swedish omni-channel retailers.	Exploratory survey
Mkansi & Nsakanda 2021	Transport	United Kingdom	Food vans lead to more traffic congestion, noise pollution and increased space requirements	Due to several delivery and collection options, OCR has a better environmental performance than pure online providers or centralised retailers.	Eco-friendly delivery methods increase brand visibility and customer loyalty	Examining advantages for UK's leading food retailers in operating an e-grocery channel using the existing retail network.	Qualitative multi-case study
Muñoz-Villamizar et al. 2021	Sustainability	Mexico	-	Fast delivery, like same day, significantly impacts costs massively (up to 15% and 68%)	-	Environmental impact of Mexico's largest (omni-channel) retailer caused by fast shipping.	Simulation model
Pan et al. 2017	Management and Data	Ireland	-	Failed home deliveries of food purchased online are a challenge due to the perishable nature of the goods (from env. and eco. perspective)	-	Using customer-related data to determine the probability of customer absence due to failed home deliveries	Experimental study
Risberg & Jafari 2022	Retail, Distribution	Sweden	-	OCR still pays too little attention to sustainability aspects in deliveries	High environmental awareness of customers in Sweden	Analyses the last-mile practices of omni-channel retailers.	Sequential, dual-phase approach

Table 2: Framework of challenges and key findings according to the three sustainability dimensions and (business) sectors

	Challenges/Key Findings			Count
	Environment	**Economic**	**Social**	
Logistics	Returns generate more waste and energy resources (*Bijmolt et al.*, 2021). High environmental impact caused by fast shipping (*Muñoz-Villamizar et al.*, 2021). Packaging waste (*Adivar et al.*, 2019)	Returns and non-sustainable transport are costly (*Bijmolt et al.*, 2021). Decentralized omni-channel networks to improve sustainability when allocating the shipping location(*Kembro & Norrman*, 2019). Failed home deliveries of food purchased online due to the perishable nature of the goods (*Pan et al.*, 2017).	Eco-friendly delivery methods increase brand visibility and customer loyalty (*Mkansi & Nsakanda*, 2021). Health (disease caused by transport side effects like pollution or noise or accident rates) (*Kayikci*, 2018).	
	3	3	2	**8**
Last-mile	Delivering goods collectively as close as possible to the point of consumption relieves the environment *[58]*. Omni-channel retail executives still pay too little attention to sustainability aspects (*Kembro & Norrman*, 2019; *Risberg & Jafari*, 2022). Food vans of OCR in the UK lead to more traffic congestion, noise pollution and increased space requirements (but better environmental performance than deliveries by pure online providers or centralised retailers) (*Mkansi & Nsakanda*, 2021).	High energy demand on the last mile (*Bijmolt et al.*, 2021; *Halldórsson & Wehner*, 2020; *Kembro & Norrman*, 2019; *Risberg & Jafari*, 2022). Last-mile most expensive delivery leg (*Bijmolt et al.*, 2021; *Halldórsson & Wehner*, 2020; *Kembro & Norrman*, 2019; *Risberg & Jafari*, 2022). Cooperations with logistics services providers to achieve fossil-free deliveries (*Risberg & Jafari*, 2022). Offering customers different/better prices for more sustainable-friendly delivery options (*Risberg & Jafari*, 2022).	Last-mile key role for customer satisfaction (speed vs. sustainability) (*Bijmolt et al.*, 2021).	
	3	10	1	**14**

Business Operations Information Technology	High environmental impact of the clothing industry (*Bilińska-Reformat & Dewalska-Opitek*, 2021). Resource efficiency (waste, pollution, land use impact (*Kayikci*, 2018) or power consumption) (*Adivar et al.*, 2019; *Bijmolt et al.*, 2021).	Reduction of the carbon footprint in fast fashion (*Bilińska-Reformat & Dewalska-Opitek*, 2021). Operational efficiency (e.g. eco-driving drivers, using recycled or reused materials and packaging; distance between product origin, and destination, transport emissions, local supplier) (*Adivar et al.*, 2019). Reducing waste, air pollution and greenhouse gas emissions are more likely to be met through the use of digital technologies (delivery time, delay, inventory, reliability) (*Kayikci*, 2018). Improving delivery distances (3–20%) and delivery rates (18–26%) with computer simulations (*Pan et al.*, 2017).	-	
	4	4	0	**8**
Costumer			Swedish customers are already more environmentally aware than retailers' executives (*Risberg & Jafari*, 2022). Enhanced consumer awareness for employment rights in the fast fashion industry (*Bilińska-Reformat & Dewalska-Opitek*, 2021).	
	0	0	2	**2**
Total	**10**	**17**	**5**	**32**

Challenges Related to Dimensions of Sustainability

Challenges in transport and logistics were mostly mentioned in the reviewed studies, the so-called "last mile" was especially emphasised or at least considered as a major challenge. These last-mile-related studies are examined in more detail in the following section. Afterwards, publications with a logistics focus are presented. Lastly, a publication with a further focus on sustainability challenges in the supply chain in omni-channel retailing is presented (*Pan et al.*, 2017).

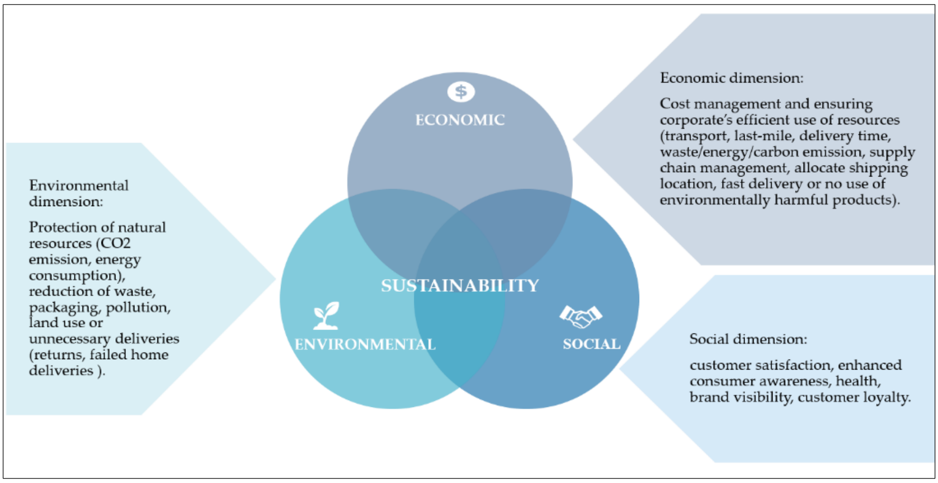
All studies on the last mile stated the high energy demand and the non-sustainable character on this final delivery leg in good transports (*Bijmolt et al.,* 2021*; Özbük et al.*, 2020*; Halldórsson & Wehner*, 2020; *Mkansi & Nsakanda*, 2021; *Risberg & Jafari*, 2022). With regard to supply chain management, *Halldórsson & Wehner* (2020) viewed the delivery of goods collectively down in the supply chain as close as possible to the point of consumption as a solution to meet this last mile sustainability challenge. *Risberg & Jafari* (2022) proposed price differentiations or advantages at the purchase (online) checkout for customers choosing a more sustainable-friendly delivery option. They also suggested cooperations with logistics services provider to achieve fossil-free deliveries. Even if e-commerce executives state an increasing relevance according to their survey, they contend that omni-channel retailers still pay too little attention to sustainability aspects in deliveries. *Bijmolt et al.* (2021) address the challenges for retailers that arise from external (consumer) as well as internal (operational) interdependencies. The study of business processes and customer behaviour was intended to help companies find ways to increase their profitability in the future. The focus of the work was not primarily the investigation of sustainability aspects, but the authors identified non-sustainable transports and returns as more cost-intensive and therefore a challenge from a management perspective. The last mile is also considered from a social perspective, as it is directly related to customer satisfaction (speed vs. sustainability). *Mkansi & Nsakanda* (2021) uncovered a certain environmental challenge on the last-mile for omni-channel retailers in the grocery industry: Deliveries with food vans potentially lead to more traffic congestion, noise pollution and increased space requirements, even if the environmental performance is better than deliveries by pure online providers or centralised retailers who do not benefit from shorter distances through a retail network (*Mkansi & Nsakanda*, 2021). Overcoming this challenge by adopting more eco-friendly delivery methods can also help companies to increase brand visibility and customer loyalty.

In the second group with five articles, transport and logistic challenges were considered from different perspectives. This group included the study by *Bilińska-Reformat & Dewalska-Opitek* (2021) which addressed the challenges of the fast fashion industry during the coronavirus pandemic. They noted an accelerated change in business models, especially towards more e-commerce and omni-channel solutions. Sustainability challenges were not the focus of the study. Nevertheless, the authors identified sustainability-related challenges in the literature review. They indicated that consumers have increasingly become aware of and raised concerns about the environmental impact and working conditions in the textile industry. Despite these developments from the customer's point of view, sustainability is still only a subordinate key factor for brand selection in the fast fashion industry. A further study by *Kayikci* (2018) indicated that the digitalization of logistics processes makes overcoming sustainability challenges easier for companies. In particular, the challenges of reducing waste, air pollution and greenhouse gas emissions are more likely to be met through the use of digital technologies. Companies that trade in so-called Fast Moving Consumer Goods (FMCG) products were examined. It is therefore not possible to clearly verify how many of them are omni-channel retailers. *Kembro & Norrman* (2019) discussed challenges of logistics information systems from the perspective of Swedish omni-channel retailers. Operational aspects such as increasing complexity, data accuracy or frequency of synchronisation were cited as main challenges (*Kembro & Norrman*, 2019). Sustainability aspects were also not the main concern of the study. Nevertheless, the authors argued that decentralized omni-channel networks, like warehouses or outlets, can help to improve sustainability when allocating the shipping location of a good. In this context, a management survey reveals the challenge of minimising environmental impact is becoming more relevant, evidenced by an increase on the Likert scale (0–7) from 2.85 (today) to 4.70 (five years). *Pan et al.* (2017) identified failed home deliveries of food purchased online as a challenge due to the perishable nature of the goods. They propose a two-stage methodological approach that uses customer-related data to determine the probability of customer absence. Computer simulations indicate that this could reduce the delivery distance (3%-20%) and improve the delivery rate (18%-26%). The reduced environmental footprint would have a positive impact on sustainability (*Pan et al.*, 2017). *Muñoz-Villamizar et al.* (2021) analyse the transport-related environmental impact of Mexico's largest (omni-channel) retailer caused by fast shipping. With the help of a simulation model, they demonstrate that a fast delivery, such as same day delivery, significantly impacts carbon emissions and influences costs massively (up to 15% and 68%).

The last remaining study by *Adivar et al.* (2019) was an analysis of omni-channel retail supply chains based on the four performance indicators of sustainability, efficiency, effectiveness and responsiveness. Sustainability-related performance factors that successful omni-channel retailers should see as a challenge and pay attention to are operational efficiency (e.g., eco-driving drivers, sustainable energy), use of recycled or reused materials and packaging, the distance between product origin and destination, transport emissions and local supplier. In addition to the economic aspects, the ecological dimension was also considered (power consumption, packaging waste).

One of the most obvious outcomes of the current review concerns the wide range of different sustainability-related challenges and key findings in omni-channel retailing, covering all sustainability dimensions (*Figure 5*). Nevertheless, the focus of most studies is primarily on increasing efficiency on the company side (economic), less on uncovering the ecological (e.g., environmental pollution) or social dimension (e.g., consumer). Challenges in transport and logistics are commonly highlighted in the literature, in particular the last-mile. Concerning methodology, primarily qualitative approaches were used. With the exception of three studies (A*divar et al.*, 2019; *Kayikci*, 2018; *Pan et al.*, 2017), the research question did not explicitly aim to uncover sustainability challenges in omni-channel retailing. Rather, the different sustainability challenges of omni-channel retailing have emerged in context and were revealed as a further result or finding of the analyses. The results indicate that there are still only a few studies that explicitly deal with sustainability challenges in omni-channel retail. The added value of this review therefore lies in summarising, classifying and structuring these challenges and thus offers a good starting point for further, even more detailed research on sustainability related challenges.

Figure 5: Interconnections of the three dimensions of sustainability challenges for omni-channel retailer



Source: Based on *Sikdar*, 2003

LIMITATIONS OF THE REVIEW

The current review has a number of limitations, for example, the diversity of information sources and selection of literature. Only review articles, research articles and conference papers from three databases were included. Therefore, relevant information from other sources may have been missed, including information from books or book chapters. However, it is noteworthy that IT and consulting companies also provide studies in the field of omni-channel retailing and/or address sustainability-related challenges for companies (*Lehmann & Teller*, 2022; Pierre *Mercier et al.*, 2014). Furthermore, this study focused only on literature written in the English language. The risk of bias due to limitations in the search process cannot be entirely negated, as the selected terms in the search string also have synonyms with similar meanings. For example, the term "sustainability" often appears in the context of words with similar meanings such as "environment", "ecology" or "green". An expansion of the search terms could be reconsidered in future reviews.

After the final screening in the method part, systematic literature reviews can be supplemented with additional systematic searches for further verification. For example, with an audit of primary sources, as recommended by *Greenhalgh & Peacock* (2005) using the "snowball" approach. This method can identify additional sources that were not found via the systematic literature search in the databases. In addition to the search according to the PRISMA criteria, no further backward screening was performed in this study. Despite the stated limitations, the current systematic literature review offers a holistic, and structured view of the sustainability-related challenges in omni-channel retail and provides a starting point for further research, which is also necessary in this subject.

CONCLUSIONS

This systematic literature review attempted to point out the established knowledge on sustainability challenges behind the academic literature on omni-channel retailing. The aim was the development of a comprehensive, structured overview to serve as a starting point for future research or to develop managerial implications in business practice. The review revealed that the number of publications on the subject of omni-channel has increased, especially in the last few years. Even if the challenges in omni-channel retail are within the three sustainability dimensions, the review of the articles indicated a slightly uneven weighting in favour of the economic dimension with a strong corporate-centric view, followed by environmental and social aspects of sustainability. One more critical revelation is that there were no reviews separately focusing on the different sustainability dimension challenges. This review makes recommendations on this gap. While few studies have included a dual perspective on omni-channel retail and sustainability challenges (*Adivar et al.*, 2019; *Kayikci*, 2018) in most articles the two components are not strongly linked.

It would be in the interests of the research field, that future studies pay even more attention in considering these two perspectives in an integrated way. The strength of this review lies in combining these two aspects. Evidently, no systematic analysis has adequately focused on the current challenges in omni-channel retailing from a sustainability point of view. However, a comprehensive study with systematic approach to identify the challenges in omni-channel retailing can be used as a starting point to stimulate future research in the scientific debate and to support integrating sustainability management into the retail business operations. The current review provides some orientation in this regard.

FUTURE DIRECTIONS

This systematic literature review contributes to omni-channel retail research by summarising the literature on sustainability challenges. Furthermore, it also identifies potential areas for future research. First, most recent studies are only focused on a specific topic. Broader-based investigations provide a coherent overview and can help marketers and researchers to understand and explore how different sustainability challenges along the entire value chain are interrelated and connected. This review identifies a need for further reviews in this complex field of research. Secondly, although this study provides a holistic overview, solutions to overcome the different sustainability-related challenges are not provided. The research landscape would therefore be enriched by more investigations, such as that by *Pan et al.* (2017), with concrete solution and approaches to addressing certain environmental, economic or social obstacles in omni-channel retail. Thirdly, the review reveals that qualitative methods, such as interviews or literature analyses, were most frequently applied in the studies. Therefore, increased use of quantitative research and data driven methods could provide an even stronger empirical evidence in future research.

If the trend of increasing publications in omni-channel retail continues as rapidly as it has in the last three years, the research field will remain relevant and provide a fertile ground for further research on sustainability challenges in omni-channel retailing.

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