12-15-2022

Working Paper No. 67, Insights into Project Cybersyn

Leah Herrera
Portland State University

Citation Details

Insights into Project Cybersyn

Working Paper No. 67

Authored by: Leah Herrera

A Contribution to the *Working Papers* of the

Department of Economics, Portland State University

Abstract: This inquiry seeks to establish that back in the 1970s Chile's "Project Cybersyn" offered novel approaches and specific technologies that appeared to have benefitted capitalism as a system. The Spanish name, SYNCO served as an acronym for *Sistema de Información y Control.* President Salvador Allende expected that the attributes associated with Project Cybersyn could assist his efforts in implementing his variant of socialism. Cybersyn consisted of a network (Cybernet), software (Cyberstride), computers, a economic simulator known as CHECO, and a control room (Opsroom.) Cybersyn reached an advanced prototype stage; however, its fate was also tied to the interests of the *politicos* who first dreamed it up. Despite many political, economic, and technological barriers, Cybersyn allowed Allende's presidency to survive several challenges. First, I shall discuss the political context, the key players, as well as the origins of Cybersyn. Next, successful Chilean resistance shall be discussed until the *coup d'etat* of 11 September 1973, when General Augusto Pinochet seized power. Finally, I shall examine the legacy of Project Cybersyn found in private sector companies as well as in selected capitalist nations.

This inquiry seeks to establish that, back in the 1970s, Chile's 'Project Cybersyn' offered novel approaches and specific technologies that appeared to have benefitted capitalism as a system. The Spanish name for the project was SYNCO, an acronym for *Sistema de Información y control.* It was developed in Chile from 1971-1973 under the leadership of President Salvador Allende, who believed it could help him democratically implement socialism. Cybersyn consisted of a network (Cybernet), software (Cyberstride), computers, an economic simulator (CHECO), and a control room (Opsroom.) Cybernet collected data from state-owned factories with only unresolved or urgent problems directed to the control room for review. Though not completed, the idea was that state 'interventors' would use (CHECO) with actual data to test the effects of policies before implementing them. Knowing a likely outcome would permit the state to efficiently manage the economy, a challenge other communist or socialist countries struggled to solve.

Cybersyn reached an advanced prototype stage, but its fate was also tied to the interests of the *politicos* who first dreamed of it. Despite many political, economic, and technological barriers, Cybersyn allowed Allende's presidency to survive several challenges. First, I shall discuss the political context, key players, and origins of Cybersyn. Next, successful Chilean resistance using Project Cybersyn until the coup d'etat of September 11th, 1973, when General Augusto

Pinochet seized power, will follow. Finally, I shall examine the legacy of Project Cybersyn in capitalist nations and firms today.

Origins of Project Cybersyn

Understanding why Project Cybersyn was created requires knowledge of Chilean politics and economic issues. Thomas Pugel, author of *International Economics* (2016, 328), teaches us that Chile practiced what is known as 'import-substituting industrialization (ISI) until 1973. ISI policies place barriers to trade while industrializing, making Chile an inward-looking nation economically. The idea is to develop new industries while relying less on exporting natural resources. However, many private foreign multinationals were active in Chile during ISI, and severe inequality existed. In this context, many Chilean people wanted changes, especially the working class and indigenous laborers. Voting for Salvador Allende was one way to accomplish this. Allende eventually became the first democratically elected Marxist President in 1970.

Allende's idea of socialism differed from other communist or socialist approaches at the time. He was a trained physician and advocated for implementing socialism peacefully rather than through violent revolution. However, Allende knew the state would not instantly possess the expertise to run the newly nationalized factories smoothly. Therefore, political imagination

necessitated creating what became known as *Sistema de Información y Control* (SYNCO) in Spanish and 'Project Cybersyn' in English. Project Cybersyn's English name is a portmanteau for 'Cybernetics' and synergy. MIT researcher Eden Medina who interviewed several of Cybersyn's creators and technologists, teaches us in her book *Cybernetic Revolutionaries* (2011, 7) that cybernetics is an interdisciplinary science concerned with communication and control.

Allende asked Chile's General Technical Director of the Corporacion de Fomento de la Produccion (CORFO), Fernando Flores, who ran Chile's economic development arm, to create the new economic system. Flores hired Stafford Beer, a very successful British cybernetician and author of *The Brain of the Firm* (1972.) In total, Project Cybersyn had four significant components though more were planned: the Cybernet (network), Cyberstride (software), Chilean Economic Simulator (CHECO), and a control room (Opsroom.) As used in Project Cybersyn, if an economic variable fell outside parameters, Cybernet would notify the most directly concerned local workers first. Then, if unresolved, the issue could be sent successively higher through up to five levels, with the fifth being the level of the Chilean state 'interventors.' This five-fold structure gives rise to the Spanish name SYNCO, a play on words, as *'Cinco'* is the word for five in Spanish.

The feasibility of making a socialist state operate democratically serves as a topic of debate in economics and academia. Medina (2011, 240) teaches that Beer

wanted to avoid creating a top-down, centralized Soviet-style approach to the economy in Chile which he viewed as restricting worker autonomy. Echoing the concerns raised by Medina and Beer, the Chilean director of Project Cybersyn, Raul Espejo, Flores's successor, published *Cybernetics of Governance: The Cybersyn Project 1971-1973* (2014, 79), where he explains that Chilean society would not tolerate central planning, and this was related to a long tradition of democracy. In addition, Medina (2011, 50) teaches that Beer wanted to minimize bureaucracy and balance bottom-up and top-down decision-making. His solution was to apply what he called the 'Viable System Model' (VSM.) Medina (2011, 52) writes that VSM was a robust framework for managing and regulating exceptionally complex systems. VSM is structured and programmed to act like a nervous system driven to maintain homeostasis, while the levels allow vertical and lateral communication. VSM, as used in Cybersyn, was designed to prevent tyranny and authoritarianism while controlling chaos.

Beer and the Chilean team were forced to get creative, given the lack of computers available in Chile and an extremely tight schedule. To overcome the lack of computers, the team devised an alternative network—the Cybernet—using government Telex machines formerly used to track satellites. Telex machines allow 2-way text messages on telegraph grade circuits and resemble a cross between a printer and a typewriter. Cybersyn gave hundreds of Telex machines

new life by connecting them directly from state-owned factories to Chile's two mainframe computers capable of processing the data and, eventually, to the Opsroom. Beer, British programmers, and Chilean technicians worked feverishly to write software and install components, all while identifying macroeconomic variables and performance indicators in varied industries. Allende's pace of nationalization was punishingly swift, and the need for Cybersyn proliferated as more factories came on board.

The Cybernet, by July 1972, was the most complete part of Project Cybersyn. While the United States ARPANET had fifteen connected 'nodes' in 1971, Cybernet joined more than fifty factories in ten industries using more primitive technology. Like the internet today, Cybernet meant greater ease of communication and facilitated creativity and problem-solving. Cybernet could collect economic data automatically directly from the factories. Paired with the software, Cyberstride, it did more than passively collect data; it could, and did, actively draw attention to urgent issues at levels workers could program for optimal intervention and prevention of problems. The data may have someday helped prevent shortages, decreased waste, or helped coordinate more efficient use of resources. As this information was near real-time, the Chilean government may have eventually realized other possibilities had this portion of the project continued to be developed. In addition, Cyberstride also contained Bayesian filtering and

control, the same technique used today in identifying and filtering spam emails. Based on Thomas Baye's Rule, Bayesian filtering predicts and then updates probabilities based on new information. Therefore, it is excellent for eliminating irrelevant information and improves over time and with more data. Besides these nascent possibilities, Espejo (2014, 84) writes that he witnessed how Cybernet reduced the need for hierarchical (state) intervention. Factories managed themselves by coordinating with their counterparts through Cybernet, a process he defines as 'horizontal coordination.'

Though Cybernet was the tool facilitating this self-organizing process, Espejo describes Beer's VSM as the structure that attempted to prevent hierarchical state control by design. VSM required Cyberstride to be programmed so that the most directly involved worker would be notified of issues. If no resolution were reached over a set time or range, the notification would rise to the next level, where the process would repeat. VSM placed management in the middle, and only problems management could not resolve would pass to CORFO and, should they not be able to assist, eventually, the state level. Ideally, the state would directly intervene in only the most difficult or pressing problems using Cybersyn. When needed, interventors would have the ability to respond quickly, with full knowledge, and with a big-picture view available in the opsroom. The

issues themselves would also serve as a way for the state to be made aware of how well it was doing as an institution overseeing the economy.

In addition to Cybernet and Cyberstride, CHECO (standing for CHilean ECOnomy and sometimes referred to as *futuro* casually by the Chilean team in Spanish) was slated to use timely data from factories to simulate the potential impacts of policy changes before plans were finalized. CHECO would allow for never-before-seen possibilities, even in developed countries, as policies could be tested using it, allowing impacts to be known in advance. In contrast to other countries, such as the Soviet Union, which used five-year plans, CHECO would have allowed planning to occur as needed. Even the development of CHECO likely was a valuable exercise as it required the identification of many macroeconomic and performance indicators. Much would have been learned about how the Chilean factories worked in actuality rather than theoretically. CHECO was to be used in the Opsroom, a space designed to encourage discussion in full view of factory data shown on multiple screens in a hexagonal room with a decidedly futuristic aesthetic. Although Beer and others fully developed much of the methodology and code, CHECO was only partially realized.

Project Cybersyn represented an attempt to improve performance and solve problems faced by other planned economies, such as that of the Soviet Union, using a completely different approach and technology. Indeed, John Michael

Montias, author of *Planning with Material Balances in Soviet-type Economies* (1959, 977-978), teaches us that problems faced by Soviet planners consisted of two types: the failure of state-owned factories to transmit data about their production functions to planners, followed by errors in executing the plans. Montias (1959, 982) further explains that improving technological norms and data processing capabilities addresses the flaws encountered in the Soviet planning process. Project Cybersyn, as designed in full, attempted to address both issues. Data collection and transmission from state factories to planners would have been automatic and filtered, with Cyberstride cutting down on extraneous information, while CHECO would allow testing and simulation.

As Cybersyn would have allowed economic planning to occur continuously and quickly, it may have resulted in better economic performance and increased flexibility over other planned economies. Montias (1959, 970-75) teaches us that much computational labor was required in the Soviet economy, and planners believed processing raw factory data would be too laborious to be worthwhile. However, one planner mentioned by Montias, A.N. Efimov, believed integrating data into a single system, as Cybersyn would have, was a potential improvement. With the Bayesian filtering and the inductive, self-organizing structure of Project Cybersyn, integrating relevant factory data may have been much more feasible and practical. In addition, Montias (1959, 976-80) teaches us that unforeseen changes

to plans trigger arduous recalculations. When this happened, planners would attempt to address only the most pressing 'first-order linkages,' such as adjusting the amount of steel to meet the increased demand for trucks. Drafting the five-year plans resulted in time lags requiring Soviet factories to operate without guidance for the first quarter until the new plans arrived. By contrast, Cybersyn's CHECO would have allowed interventors to simulate potential issues beforehand with actual data, identify bottlenecks, and more prior to or during implementation. Cybernet and Cyberstride might have alerted interventors to problems in near real-time, thereby addressing the second problem faced by the Soviet planners fully, as discussed by Montias. As Cyberstride was programmed to improve and update its probabilities, it would have been more adaptable to changes and perhaps achieve increased accuracy over time. Therefore, as Cybersyn did contain the relevant technological improvements that Montias and others see as solutions to issues faced by Soviet planned economies, Chile's economic performance with Cybersyn, given enough time and development, may have eventually represented an improvement over the Soviet style.

Another unrealized part of Cybersyn was an early precursor of today's social media, which Beer called 'Cyberfolk.' Cyberfolk would have linked algedonic dials people could turn to indicate pleasure or pain to be sent in aggregate along the Cybernet to the highest level of government. The dials were to be installed in

homes and workplaces so people could signal quickly. Today, one can see a much richer implementation of this concept in social media, especially in the ability to upvote or downvote, drawing attention to needed change. Would it have worked? Arguably yes, as many events in the past few decades have begun as social media movements and, with vigorous reactions, eventually received attention from the highest levels of government.

Mainstream economists frequently examine the tendency of state-run establishments to become slow, bureaucratic, and inefficient. It is frequently said unlike private businesses, state-run institutions are disincentivized to provide excellent customer service. Beer imagined Cyberfolk as a potential solution to this issue in the form of a tool people could use to help hold the state responsible for its policies by increasing accountability. In addition, Cyberfolk would have been a valuable alert for the state to improve, change, or discard a policy before more drastic actions, such as riots, occurred. At its most ideal, Project Cybersyn was intended by Beer to make the state so exemplary at managing the factories and economy that Chileans would prefer and embrace it. However, Beer emphasized that Cybersyn be implemented in its entirety as safeguards against coercion would only be adequate with all of the components in place and being used as designed. Though this did not have the chance to occur as conceived, the intent and attempt

to implement his vision remain valuable in light of the power of technology in use today.

Cybersyn and Chilean Resistance

Declassified CIA documents (United States Central Intelligence Agency, 1972) reveal that, as Allende's government nationalized additional factories, resistance from upper-class Chileans, business owners, national and foreign elites, right-wing politicians, and others grew more pronounced. Private investment slumped 60%, but likely even more than statistics would indicate. Foreign multinationals in Chile resented having assets taken over by nationalization. Domestic and foreign businesses held back on expanding while relations between Chile and the US cooled publicly and worsened behind the scenes. Chile increased imports to meet demand, which was costly given the pre-existing ISI policy. The Chilean government struggled to pay its debts and expand the government welfare programs that Allende had promised. Allende had also raised wages at the beginning of his presidency, creating a consumer boom. As a result, inflation skyrocketed, eroding support for the Allende government as time went on. Allende implemented price controls, and wages were raised again to mitigate this, but hoarding, queueing, and black markets emerged as consumer shortages increased.

Despite this, Allende prevailed though more of Chilean society was changing its stance as patience wore thin.

Powerful international pressures exacerbated the economic troubles faced by Chile. CIA and other government documents (Staff report of the Senate Select Committee on Intelligence Activities: Covert action in Chile, 1963-1973; National Security Archive, 2020; United States Central Intelligence Agency, 1972) reveal that the United States imposed a secretive financial blockade on Chile, funded propaganda, and performed 'direct' interventions against Allende's government. According to the Senate Select Committee (part b), the CIA paid $1.5 million to *El Mercurio*, a Chilean paper based in Santiago, to continue to publish stories that cast a pall over Allende and Project Cybersyn. Accounts linked Cybersyn to Orwell's 'Big Brother' implied technocracy and suggested totalitarianism would inevitably result. Beer advised that Project Cybersyn be introduced transparently to the greater public to counter this, but a public reveal never occurred. Accordingly, it was relatively easy for opposing parties to fan flames of mistrust.

Medina (2011, 156-183) teaches us that Chile's political right, elites, and private business owners were increasingly agitated with Allende and actively sought to set the stage for a military coup. Beginning in October 1972, members of this anti-Allende community thought their opportunity had come when a *'gremio,'* or business association, of truckers in the provence of Aysén, went on strike in an

event known as *'el Paro de Octubre.'* The private truckers were unhappy that the

Allende government had created its own trucking company in what it perceived as

an underserved area. The number of truckers striking soon reached forty-thousand.

Other *gremios* joined the strike, including doctors, lawyers, and, most

devastatingly, engineers. They refused to transport goods, blocked roads, and

attempted to cripple the economy by withholding services and actively forcing

many businesses to close through 'enforcement squads.' The effects were powerful

initially. 70% of private buses stopped running, 80-90% of companies in

Valparaíso and Viña del Mar closed during the strike, and consumer goods were

destroyed by the political right to exacerbate shortages. How did the Allende

government continue in the face of such opposition?

The role played by cybernetics in the October Strike is not frequently a

focus; however, Project Cybersyn—especially Cybernet—is a significant reason

that Allende's presidency successfully resisted the October Strike. Medina (2011,

161-2) reveals that Flores organized command centers in critical locations and

sectors of the economy. The Cybernet was used to rapidly locate those workers

still loyal to the government and coordinate their activity to help them avoid

blockages, increase distribution, facilitate transportation, and more. The

Cyberstride software on Cybernet quickly identified critical shortages and

conveyed urgent messages about factory production to those in government who

could respond. The state used data to create reports that gave a current 'big picture' view of the economy faster than even developed nations at the time. According to Beer, about two thousand messages were passed daily on the Cybernet during the strike. Factories used it to sidestep bureaucracy, improve distribution directly amongst themselves, and, in some cases, alleviate shortages in their local areas. The use of Cybersyn to manage the strike and overcome it seemingly confirmed the cybernetic viewpoint that the best systems should adapt, respond, rebuild themselves, and handle complexity while maintaining stability. Ultimately, just two hundred truckers and loyal workers stocked and ran emergency and vital services, and many factories continued production during the strike.

Most importantly, Cybersyn allowed the people who still supported the government to have direct means of communication and receive high-level support quickly. Commonly, those focused on designing technology or systems minimize or overlook the people who eventually use them in unexpected ways. For example, planning political safeguards or concepts like 'worker autonomy' into a technological system might seem possible theoretically but prove nearly impossible in practice. However, the October Strike reveals that people supportive of Allende's government adapted Project Cybersyn to successfully meet changing sociopolitical goals, which, in a way, did fit with the creators' cybernetic viewpoint.

Allende's government retained military support during the strike, helping

keep it in power and decrease aggression from the far right, who had hoped to use

the military themselves to overthrow Allende. However, their timing could have

been better, and they did not anticipate the successful resistance Cybersyn enabled.

As a result, the strike ended in a stalemate on November 2nd, 1972. However, it

was the beginning of the end for the Allende government. Rightfully, Flores

believed that Project Cybersyn worked but was no defense against tanks or planes,

a future that now seemed increasingly likely.

Takeover and Integration of Cybersyn's Key Ideas

Project Cybersyn proved valuable after the Allende government successfully

resisted the October Strike. Beer continued to work on Cybersyn and advocated for

its development along with the Chilean team. However, the political environment

became increasingly unstable even after the October Strike was resisted with

cybernetic aid. Midterms occurred in March of 1973; surprisingly, the Chilean

Congress was split, and parties in opposition to Allende did not get the votes

required to impeach him. Among these, the Christian Democratic Party (DPC) had

pinned its hopes on midterms. With impeachment impossible, the DPC began more

actively entertaining alternative means to oust Allende. In addition, the Senate

Committee report (part 2a) found that the CIA funded the DPC so they could buy

media channels to create anti-Allende propaganda. The CIA viewed these activities as helping both pave the way for the October Strike and Pinochet's September 11, 1973 coup d'etat in which Allende died. The Senate report (I.2) reveals that $8 million was spent by the CIA between 1970-1973 and asserts this figure is likely an understatement. Using the Consumer Price Index (CPI) Inflation Calculator (U.S. Bureau of Labor Statistics, 2022) from December 1973, by which time the money would have been spent, reveals that $8 million is approximately $51,603,809.52 in October 2022 dollars. In a comparatively small economy like Chile's in the 1970s, this was a good deal of money and would have allowed for a powerful impact and intent.

Additionally, Medina (2011, 238) teaches that the United States undertook additional actions to bring the Chilean economy to collapse, knowing this would weaken support for the socialist government. Medina's account is also primarily confirmed in the CIA documents discussed that were released after the fact. Therefore, analysis of the Allende government's economic performance is only possible in conjunction with the broader political context. Though CIA activities helped secure the coup, internal dissatisfactions within Chilean society also allowed these tactics to succeed. On September 11th, 1973, General Augusto Pinochet executed a violent military coup d'etat at the Presidential Palace, La Moneda. He then established a military *junta* form of government which US

President Nixon quickly recognized. Whether Allende killed himself or was killed in the coup is still debated; however, decades of liberal democracy in Chile ended with his death. Cybersyn's creators and technicians, including Flores, Espejo, and others, were imprisoned or fled the country. In addition, the Pinochet government systematically tortured, imprisoned, or 'disappeared' many Chileans supportive of the Allende government.

The Opsroom and other parts of Project Cybersyn were said to have been destroyed after the Pinochet takeover. After the coup, Pinochet became President of Chile in 1974 and quickly adopted a neoliberal economic policy. Author Barry Stewart Clark (2016, 61-3) teaches us in *The Evolution of Economic Systems: Varieties of Capitalism in the Global Economy* that neoliberalism is a free-market-oriented approach in which government intervention is minimized in favor of private businesses. Pinochet followed the tenets of the neoliberals faithfully, opening Chile's market to international trade and exporting raw materials again. Relations with the US improved markedly soon after further boosting Chile's economy. Reports of human rights abuses by the Pinochet government were mostly downplayed.

As Cybersyn represented a different approach to economic planning and required creating unique tools to solve challenging economic problems, some of the solutions developed apply beautifully to capitalism and capitalist firms. For

example, it is much easier to collect and transmit data to the correct individual for analysis and planning when the system is a single firm rather than an entire economy. Beer had become known for doing so prior to Cybersyn at US Steel. Therefore, Cybersyn's tools being developed for a much more robust application would have been extremely powerful when customized and applied at a smaller scale, such as in a single firm. Such implementations were indeed successful, as shall be discussed below. However, it is sufficient for now to observe that rather than viewing alternative economic approaches as inherently threatening as has usually been the case, they can instead be studied to identify valuable insights that may improve an existing system if customized and adopted. As Project Cybersyn attempted to improve on the planned economic approaches that came before, some of its tools hypothetically held more potential as capitalist nations, like the United States, began to amass immense computing power and build vast networks. Cybersyn's cybernetic approach and the VSM behind it dovetailed with the coming of the internet age, making its relative obscurity mysterious. Perhaps the experiment's short duration, the fact that it occurred in Chile, and its alleged physical destruction contribute to Cybersyn's anonymity today. Likely, after Pinochet's coup and Cybersyn's destruction, there were few reasons to broadcast information about it, given the political and economic motivations at the time. Perhaps, to the new government, Cybersyn may have represented an embarrassing

failure or maybe a reminder of what they desired to dislodge in society, as implied by Buc. However, ideas, concepts, and ways of thinking proved more resistant to destruction as Beer and others did manage to take these with them outside Chile. Cybersyn's creators saved as much as possible once they detected the impending power shift, and several key people are still alive and working in related areas where Cybersyn's ideas have impacts today.

Cybersyn was an information system that facilitated bi-directional communication and was coded to become 'smart' enough to update, filter, and improve probabilities and predictions. Many capitalist firms desired cybernetic capabilities at the time of Cybersyn's implementation. Automating data collection from direct sources and transmitting the most relevant information is highly prized today and utilized today in the United States by most successful companies. Cybersyn was never intended to be centralized or hierarchical, so its ideas, tools, and technologies were especially applicable to independent private firms.

Cybersyn's attempt to aggregate important economic data automatically can even be seen, to a certain degree, in the Federal Reserve Economic Data (St. Louis Fed, n.d.) maintained by the United States St. Louis Federal Reserve Branch since 1991. FRED contains vast amounts of economic data from many United States government branches. Data flows from local, federal, international, and supranational sources and private firms. Moreover, FRED's economic information

is centralized in a freely available public database; an essential factor Cybersyn did not include. As Cybersyn's economic data was unavailable to the general public, this likely contributed to distrust and suspicion, which proved an essential factor in its downfall. Another critical difference is that FRED data comes from many sources worldwide, and it is up to the individual to use the raw data, usually in the form of a graph. Finally, FRED contains no algedonic dials that alert the public to economic extremes or vice versa unless one creates them independently. Nor does it filter information or predict outcomes using Baye's Rule. Therefore, FRED did not spring from Cybersyn, but rather Cybersyn's objectives were not impossible or foolish; they were futuristic visions ambitiously attempted with limited resources. As Cybersyn's creators later managed to contribute their knowledge in capitalist firms, systems, and nations and were financially rewarded and recognized, this confirms their vision was valuable given an appropriate context.

Project Cybersyn's creators, like Flores, Espejo, and others, tended to find measurable successes in the capitalist countries they migrated to after the 1973 coup. Of these, Flores became a very successful Silicon Valley entrepreneur and a Stanford Department of Computer Science researcher. After leaving Chile, Beer faithfully lobbied for Flore's release from prison, which finally occurred three years after the coup. Flores used the ideas and insights he had learned while creating Project Cybersyn with Beer to help capitalist businesses in the United

States. Flores also published a highly regarded book with artificial intelligence expert Dr. Terry Winograd, *Understanding Computers and Cognition: A New Foundation For Design* (1990), describing his approach, which was well received. In addition, he started several consulting firms: Logonet, Action Technologies, Hermenet, and Pluralistic Technologies. Medina (2011, 249) teaches us that Flores wrote a software program that a journalist later described as an early corporate social networking tool called the 'Coordinator Workgroup Productivity System.' Flores described it as one of his most successful projects. Coordinator is very cybernetic in that it is concerned with improving communication in a corporate environment, reflecting the 'communication and control' mandate from cyberneticians. For example, Coordinator could share worker calendars and organize discussions by category. Flores was well-rewarded for his expertise in the capitalist environment, quickly becoming a multi-millionaire. This success undoubtedly aided him as he returned to Chilean politics, became a Senator in 2001, and later ran for President of Chile, though he was not elected. Medina (2011, 249) notes that Flores moved towards neoliberalism, leaving behind his former role as a 'socialist minister.'

Flores's turn to neoliberalism aligned with the overall political trajectory in Chile. For example, Hernán Buc served as Chile's Minster of Finance under Pinochet. In *How Chile Successfully Transformed Its Economy* (2006), Buc

describes implementing neoliberal policies that appear to have improved the

Chilean economy. Buc's analysis serves as an example of the new economic

approach post-Allende. Private business, the free market, and the entrepreneur are

lauded. At the same time, Buc criticizes Chilean society for not appreciating the

entrepreneur's role sufficiently and desiring more than economic success. As Flores

met with entrepreneurial successes in the United States and became politically

focused, his transition to embracing neoliberal thought grew increasingly apparent.

Flores eventually backed the right-wing candidate for President of Chile, Sebastián

Piñera, who won. Undoubtedly, Flores adapted, a quality that happened to be a

prized trait in Beer's Viable System Model and Cybersyn overall.

   Interestingly, Project Cybersyn's VSM continues to be developed and used

by Espejo (*Big Data, Variety Engineering, and Governance*, 2022), who also

directly advocates for it today. Like Flores, Espejo succeeded in helping capitalist

businesses apply the socialist ideas taken directly from the time he was working on

Project Cybersyn. Medina (2011, 240-1) writes that Espejo moved to England after

the coup and formed Syncho Ltd., the name a direct connection to the Spanish

SYNCO of Project Cybersyn. Syncho Ltd contracts with government agencies

worldwide, mainly in capitalist countries such as Germany and Great Britain.

However, he also had great success working with the National Audit Office of

Colombia, where he applied VSM to their state-owned enterprises. In this way,

Cybersyn's tools proved helpful in economic systems beyond capitalism though capitalists' projects outnumber them by a large degree.

After the coup, Stafford Beer wrote six more books on cybernetics and management. He also helped call attention to the imprisonment of those he had worked with in Chile and provided assistance and placements for them once they were released. He was invited to develop projects in Mexico, Uruguay, and Venezuela, but none reached the stage Project Cybersyn had. Medina (2011, 249) teaches us that Beer became more dedicated to addressing societal problems with cybernetics, unlike Flores. He also urged developing nations to pursue loftier goals than economic growth and consumerism. However, his management ideas were most persistently used in capitalist systems and firms and are still being applied today. Medina (2011, 240) reveals that the international consulting firm Malik Management, which employs several hundred people, relies on Beer's approaches to manage complexity and solve management problems holistically. Their website (Malik Management, n.d.) reveals several images of models with some elements echoing Beer's hand-drawn diagrams from the days of Project Cybersyn.

Conclusion

This inquiry has sought to establish that Project Cybersyn's key ideas and approaches offered unique benefits to capitalism. Project Cybersyn benefitted

capitalism by enabling better communication and control over the means of production using near real-time data and analysis. Therefore, Chile's cybersocialism offered a window into the future. In addition, Cybersyn utilized a different approach to economic planning than that employed by the Soviet Union. Cybersyn's creators attempted to solve problems characteristic of planned economies, and there were indications of improvement in critical areas. However, assessment is limited due to the project's short duration and limited development.

Multiple documentaries (Plastic Pills, 2021; Prosocial Progress Foundation, 2021) exist with interviews and footage describing the democratic socialist dream Project Cybersyn hoped to achieve. However, this dream is surprisingly occurring in capitalist countries and firms, as manifested by the automation of Amazon's warehouses using factory data, Uber's matching algorithms facilitating a decentralized gig economy, the rise and impacts of social media, the impressive FRED database, and more. A direct and clear connection between Cybersyn's creators and their successes after Project Cybersyn shows they were both a threat and a boon to capitalism yet ultimately contributed to strengthening it by bringing the results of their experience with them and sharing what they had learned.

Criticisms against Cybersyn—that it resembled Orwell's 'big brother,' which would bring about totalitarianism or technocracy—focused on the state using Cybersyn's technology to control the worker further. However, this would be

much more of a possibility now than it was with the limited computing available during Cybersyn's creation. Moreover, as Cybersyn enabled successful resistance against what was later a repressive military *junta* form of government, this indicates that technology, systems, and ideas ultimately reflect the values of the members of society using them, even, or especially when, these change.

Bibliography:

Barry Stewart Clark (2016). *The Evolution of Economic Systems: Varieties of Capitalism in the Global Economy*. New York: Oxford University Press.

Espejo, R. (2014). *Cybernetics of Governance: The Cybersyn Project 1971–1973*. [online] Research Gate. Available at: https://www.researchgate.net/publication/290742382_Cybernetics_of_Governance_The_Cybersyn_Project_1971-1973.

Espejo, R. (2022). Cybersyn, big data, variety engineering, and governance. *AI & SOCIETY*, 37. doi:10.1007/s00146-021-01348-0.

Hernán Buc (2006). *How Chile Successfully Transformed Its Economy*. [online] The Heritage Foundation. Available at: https://www.heritage.org/international-economies/report/how-chile-successfully-transformed-its-economy [Accessed 13 Nov. 2022]. Hernán Alberto Büchi Buc; born March 6, 1949) is a Chilean economist who served as minister of finance of the Pinochet government. In 1989 he ran unsuccessfully for president with the support of Chilean right-wing parties.

Malik Management (n.d.). *Basic Malik Models*. [online] Malik Management.

> Available at: https://www.malik-management.com/malik-approach/basic-
>
> malik-models/ [Accessed 30 Nov. 2022]. Website of the firm employing
>
> Stafford Beer's ideas of information systems.

Medina, E. (2014). *Cybernetic revolutionaries: technology and politics in*

> *Allende's Chile*. Cambridge, Massachusetts: The MIT Press.

Montias, J.M. (1959). Planning with Material Balances in Soviet-Type Economies.

> *The American Economic Review*, [online] 49(5), pp.963–985. Available at:
>
> http://www.jstor.org/stable/1813077 [Accessed 18 Nov. 2022].

National Security Archive (2020). *Allende and Chile: 'Bring Him Down.*' [online]

> National Security Archive. Available at: https://nsarchive.gwu.edu/briefing-
>
> book/chile/2020-11-06/allende-inauguration-50th-anniversary [Accessed 13
>
> Nov. 2022]. A good source of many official, original US government
>
> documents on policies towards Chile re: Allende's government.

Plastic Pills (2021). *Cybersocialism: Project Cybersyn & The CIA Coup in Chile*

> *(Full Documentary by Plastic Pills)*. [online] www.youtube.com. Available
>
> at: https://www.youtube.com/watch?v=RJLA2_Ho7X0 [Accessed 13 Nov.
>
> 2022].

Prosocial Progress Foundation (2021). *PROJECT CYBERSYN*. [online]

    www.youtube.com. Available at:

    https://www.youtube.com/watch?v=_SIwml2OBho&t=4s [Accessed 13

    Nov. 2022].

Pugel, T.A. (2016). *International economics*. 17th ed. New York, NY: Mcgraw-

    Hill.

St. Louis Fed (n.d.). What is FRED? | Getting To Know FRED. [online] What is

    FRED? Available at: https://fredhelp.stlouisfed.org/fred/about/about-

    fred/what-is-fred/ [Accessed 7 Dec. 2022].

Staff report of the Senate Select Committee on Intelligence Activities: Covert

    action in Chile, 1963-1973.[online] Available at:

    https://www.archives.gov/files/declassification/iscap/pdf/2010-009-

    doc17.pdf [Accessed 16 Nov. 2022].

Stafford Beer (1995). *Brain of the firm*. 2nd ed. New York: J. Wiley.

U.S. Bureau of Labor Statistics (2022). CPI Inflation Calculator. [online] Bls.gov.

Available at: https://www.bls.gov/data/inflation_calculator.htm [Accessed 6

Dec. 2022]. The CPI inflation calculator uses the Consumer Price Index for

All Urban Consumers (CPI-U) U.S. city average series for all items, not

seasonally adjusted. This data represents changes in the prices of all goods

and services purchased for consumption by urban households.

United States Central Intelligence Agency (1972). *CHILE ALLENDE'S*

ECONOMIC RECORD | CIA FOIA (foia.cia.gov). [online] www.cia.gov.

Available at: https://www.cia.gov/readingroom/document/cia-

rdp85t00875r001700030070-0 [Accessed 13 Nov. 2022]. Accessible by the

Freedom of Information Act.

Winograd, T. and Flores, F. (1990). Understanding Computers and Cognition: a

New Foundation for Design. Norwood: Ablex.