Editorial project coordinated by
Universitatea Politehnica Timișoara and FABER

Descrierea CIP a Bibliotecii Naţionale a României
Bright cityscapes / ed.: Martina Muzi, Nadine Botha,
Bianca Schick, Oana Simionescu
Timişoara: Editura Politehnica, 2023
Conţine bibliografie
ISBN 978-606-35-0555-3
I. Muzi, Martina (ed.)
II. Botha, Nadine (ed.)
III. Schick, Bianca (ed.)
IV. Simionescu, Oana (ed.)
71
008

Published by
Editura Politehnica, in the 'Arhitectura' collection
Bd. Republicii 9, 300159, Timișoara
Tel. 0256.403.822
E-mail: editura@upt.ro
Redactor: Claudia MIHALI

Editura **POLITEHNICA**

Print run
135

Printed by
AZERO (Bucharest)

Typeface
Camera + Camera Plain (ABC Dinamo)

brightcityscapes.eu

Editorial team
Martina Muzi
Nadine Botha
Bianca Schick
Oana Simionescu

Copy editor
Nadine Botha
Daniel Friedman

Contributors
Vlad Alexe
Versavia Ancuța
Vlad Bejinaru
Negar Sanaan Bensi
Théophile Blandet
Cristian Blidariu
Laurin Bohm
Cinzia Bongino
Ioan Both
Nadine Botha
Cristina Cochior
Connor Cook
Anamaria Degău
Louella Exton
Daniel Friedman
Loredana Gaiță
Jing He
Vanessa Heider
Raul Ionel
Joshua Jerome
Richard Temple Kingston
Petar Kukec
Denisa Landler and Edward Kiss
Flora Lechner
Guilemette Legrand
Alina Lupu
Petre Mogoș and Laura Naum
Martina Muzi
Simone C Niquille
Parasite 2.0
Roberto Pérez Gayo
Norbert Petrovici
Santiago Reyes Villaveces
Federico Santarini
Bianca Schick
Oana Simionescu
Cristina-Sorina Stângaciu
Anastasia Stolearenco
Mihaela Tilincă

Graphic Design
Kirsten Spruit

Photography
Anwyn Howarth
Seba Tătaru
Alexandru Todirică
Marius Vasile

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Editorial team
Martina Muzi
Nadine Botha
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Oana Simionescu

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Daniel Friedman

Timișoara 2023 European Capital of Culture

EUROPEAN CAPITAL OF CULTURE

Co-funded by

Funded by City of Timișoara Center for Projects

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BRIGHT CITYSCAPES

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0. Introduction

Bright Cityscapes: Designing Possibilities

CURATORIAL ESSAY 30.10.2023 TEXT BY MARTINA MUZI

Digital technology and global supply chains continue to drive relentless evolution in manufacturing. The loading of advanced automation, artificial intelligence, big data analytics, and the internet of things (IoT) onto the conveyor belt has wrought a metamorphosis in the very core of production processes. New levels of efficiency, personalisation, and interconnectedness have become possible.

Supply chains continue to evolve into intricate, sprawling networks that transcend geographical boundaries. This evolution represents a symbiotic relationship between manufacturing and digitisation, and it's reshaping everything, not just geopolitical alliances, economic interdependencies, and power structures, but also skills, resources, and assembly lines at a multitude of scales.

Industry has been an important part of life in Eastern Europe since the days of the Austro-Hungarian empire. Since then, there has been consistent investment in industry, transforming this entire area into an industrial and agricultural hub. For this reason, foreign direct investment (FDI) had a powerful start in Romania both before and after 2007, when the country joined the European Union (EU). Since then, Romania's manufacturing sector has increased to become a third of its GDP. Nowhere is this transformation more visible than in Timișoara, where burgeoning industry spills over to inform every part of daily life, not least its culture and its education system.

In Timișoara, expertise is everywhere, inside large companies, within academic laboratories, on production lines, and in street markets. Here, design can be found hiding within mathematical formulas, computations, sophisticated technological objects, mechanical parts, material studies, chemical processes, and, perhaps most of all, in so-called intermediate products.

It's a challenge, making sense of all the unpredictable fluctuations in this age of company sovereignty, borderless consumerism, climate anxiety and profit-driven technological acceleration, where our relationships are mediated by objects, information and infrastructure. Design, architecture and digital culture, ladened with blind spots and steeped in Eurocentric perspectives as they are, have become practices with the potential to both reveal and react to this uncertain present. Practices that, to me, have the ability to open conversations.

Conversations through a city

At the heart of the Bright Cityscapes programme lies a fundamental element: conversation. The programme's development has thrived through a continuous dialogue, not only between the organisers, researchers, and city, but also among the designers, collaborators, and contexts. I have been continuously inspired by how this ongoing exchange has been pivotal in determining the programme's design questions, driving its evolution and shaping its projects, and ultimately culminating in the *Turn Signals—Design is not a Dashboard* exhibition. The publication that you hold in your hands is not only an archive of this conversation, but an invitation to extend it.

The transformative role of exhibitions, not merely as showcases of end results, but rather as initiators and revealers of knowledge, collaboration, and conversation, has been central to my approach to Bright Cityscapes. Underpinned by principles of transparency and accessibility, the project has situated itself firmly in Timișoara. There, it looked inside proprietary factory walls and disciplinary knowledge silos, commissioned and shared original economic research, instigated design research and collaboration projects through novel partnerships, and prototyped alternative educational strategies and mediums. This publication serves as a window into the various processes that underpin the programme, offering insights into how design can intersect with different aspects of a city's life.

Timișoara as nexus

As a flagship initiative of the Timișoara—European Capital of Culture 2023 programme, Bright Cityscapes evolved through a partnership between the Politehnica University of Timișoara (UPT)—the city's pivotal hub of engineering knowledge production and exchange—and FABER—an emerging independent cultural centre that hosts a wide array of the city's multidisciplinary practices and activities. As a product of this creative ecosystem unique to Timișoara, the programme has consistently adhered to its commitment to grow from the city's intrinsic questions.

How does one get to know a city? Some would say by walking through its streets, markets, and squares, and engaging with its inhabitants. Others would argue that the discovery starts through remote research about its history, tourist attractions, cultural programmes, and schools. Others would look at its infrastructures, landmarks, fauna or flora. Others would watch a movie, connect to its radio station, navigate it through google maps. Someone would

look at its productions and what is made locally; many would ask their friends, colleagues and family if they have ever been there.

In between the possible methods of discovering a city and through different strategies of engaging with another reality, the Bright Cityscapes programme placed Timișoara firmly at the heart of the project. Not as a beginning or end, but as a nexus that links to various other places and systems. It embodies the idea of observing what flows through, what starts, and what ends, providing a distinctive perspective from which to explore design's interconnectedness.

Behind the factory walls

For myself and the Bright Cityscape team, the first step was about trying to understand how we see the city through our own lenses—our own eyes, our own knowledge, our own experiences—not in order to give answers, but to understand the methodologies and positions from which the project begins. To gain first-hand insights into Timișoara's industrial ecosystem, we embarked on an adventure of visiting local factories.

Factories are complex places. They produce so many different elements of what is consumed by everyone every day, but they are not typically open. These often inaccessible spaces proved to be treasure troves of knowledge, serving as a bridge between becoming aware of our lenses, and the data-oriented research, expanded on a little later in this piece of writing, that frames Timișoara as a city of manufacturing and engineering.

This resulted in a preliminary exhibition titled *Mirroring the Ecosystem*, that presented selected artefacts, products, and components from the visited factories. This was made possible through collaboration with companies that temporarily contributed elements from their production lines for the exhibition, evidence of the network of conversations that Bright Cityscapes instigated.

The modular exhibition structures, akin to those employed by Flex in their assembly lines, were made in collaboration with Flex and Azur. These paid homage to the context, and alongside the photographic documentation of the factory visits, provided exhibition visitors an immersive experience of the factory floors.

After its debut at FABER, the exhibition travelled to UPT, finding a home in a genuinely beautiful space on the campus. Here, it became even more accessible to students and the academic network, fostering conversations among the everyday scholars, PhD candidates, and professors who reside on the campus. This underscores the ability of exhibitions to journey beyond their original location, and instigate meaningful interactions in different contexts.

The layers of the economy

The result of visiting manufacturing environments physically with our bodies, and speaking to engineers, operators and workers, the *Mirroring the Ecosystem* exhibition served to activate the process from which a large part of the programme emerged. My intention behind the exhibition was to mirror Timișoara to its citizens, drawing to attention the lenses with which its agents understand the city.

In order to corroborate and challenge these lenses of the city itself, Bright Cityscapes simultaneously initiated an interdisciplinary collaboration with data analyst and sociologist Norbert Petrovici. Through the collaboration, original research was done into how the city's economy was formed, uncovering the major forces that have shaped its current state. By researching the economy of the city, so many different layers of the city are considered—the landscape, the climate, the everyday life of people, the jobs, and of course, the industries and the university. A research team of data scientists, anthropologists and a historian, under the leadership of Petrovici, developed a report, titled 'Economy in Timișoara: Territorial Distribution of the Economy in the Timișoara Metropolitan Area', which became a cornerstone for Bright Cityscapes.

The initial visits to factories that formed part of the curatorial process, provided the opportunity for Petrovici and his team to extend their data analysis into anthropological research of the experience of workers. Interacting almost weekly with the team that was developing the report, allowed me to participate with the formulation of new questions and thematics along the process. This experience of seeing how design curating can also collaborate and share processes with other disciplines laid the groundwork for the collaborations that would form the core of the design projects.

Fostering collaborations, continuations and constellations

The bridging of disciplines that went into the research report resonated with one of the core aspects of the programme: generating opportunities for research exploration and fostering exchanges. While the term 'exchange' encompasses various interpretations, our primary objective was to establish channels through which diverse disciplines could come together to collaborate. We left the definition of collaboration open-ended. This focus essentially steered us in designing a programme that, at different junctures, would engage various disciplines and practices.

In particular, an open call was launched to UPT researchers who might have research within their labs that they wanted to share with a designer. From those that applied, four applicants were selected by an internal jury of representatives from FABER and UPT, and subsequently matched with international designers. To me, what is beautiful about the engineers that applied was the specificity and realness of their research; it's a practice of details that have been tested, retested and applied across laboratories in the university and companies. When the designers get involved, they look at the same research through completely new lenses, forging new understandings and new forms of working.

When selecting designers to participate in Bright Cityscapes, it was important to invite practitioners who have cultivated idiosyncratic design practices and positions in order to challenge the programme, and expected notions of Timișoara and design. For many of these designers, their projects represent a continuation of their work. Their projects also demonstrate how designers build on and constantly reinvent their research in new contexts like Timișoara in order to establish practices. Through the broadly different design discourses, media, skills, ways of thinking, and realities from which all the designers come, the programme thus also sets up a conversation around the nature, meanings, and application of design itself.

All of the designers worked with Timișoara as nexus, whether through a direct collaboration with a local researcher, whether through the research report as a guide, or whether by constellating particular assemblages of knowledge and partners. Some of the participants moved to Timișoara for a creative research residency, allowing them to engage with the specific context and knowledge of the city. Others looked at how global phenomena manifest in Timișoara, Romania, or Eastern Europe. Others sought to establish a local connection or develop a local case study that furthers their existing research into particular concerns.

Between their diverse practices and divergent approaches, the designers engage with Timișoara in many different ways. The results portray the design discipline as a discourse that is constantly negotiating the relation between digital and physical practices, suggesting and emphasising a constant inquiry into technologies, materialities, archives, landscapes, and infrastructures, and their related narratives, applications, imaginaries, technicalities and unsolved questions.

Changing lanes

Motivated by the ethos of openness and sharing, curiosity and research, and collaboration and exchange, the Bright Cityscapes programme considered what design is in Timișoara, and what it might be. Through its series of design projects and conversations, it was striking to me that a lot of design was hidden behind factory walls, obscured by knowledge silos and lost through missed connections.

The programme's culmination, the exhibition *Turn Signals—Design is not a Dashboard*, sought to present a world of alternative interpretations and imaginings of the potential of design in Timișoara. The exhibition also featured visual infographics and a technical lexicon developed from the economic report. This served to situate the projects within the journey of the Bright Cityscapes programme, and the economic data and manufacturing systems from which their knowledge and collaborations emerge. The mediation programme was another important element of the exhibition that sought to find additional translations to different publics, thereby expanding the openness and accessibility of the exhibition and programme.

The exhibition's title provokes us to view design beyond mere process optimisation and mass-produced industrial solutions. Instead, it delves into design as a discipline for uncovering and manifesting hidden signals and opportunities for change, countering the dominating technocratic discourse. It highlights the potential found in the gaps and blind spots created by optimisation and standardisation.

The projects address a myriad of thematics, such as the impact of global phenomena like outsourcing on local experiences and domestic scenarios, the import and export of knowledge as capital, the web of dependencies within global supply chains, academia's role in knowledge production versus perpetuating standards, the effects of digitalisation and automation on daily life, working conditions, and the global economy, and more.

What if, when discussing digital infrastructure, we consider independent solutions outside of national frameworks? What if, when exploring automation, we also recognise the value of errors? What if, when examining imports and exports, we focus on waste rather than just freshly made products? What if we incorporate the perspectives of geologists when discussing hardware? What if subverting the linearity of supply chains can occur gradually through small inquiries?

Perhaps it's time to direct our efforts towards understanding the inaccessible. Maybe it's time for industries and institutions to recognise and support the explorations of independent design practitioners as essential to challenging perspectives and observations otherwise gridlocked by market demands.

Future generations

Part of understanding the significance of design as more than a discipline simply oriented towards optimising industrial products is also understanding design education not as an endeavour to only produce product makers. This is why in my own practice, design and education are so deeply intertwined.

Bright Cityscapes initiated numerous educational elements, including the 'Atlas of Distances' workshop that emerged from a pedagogical collaboration and exchange between the Faculty of Architecture and Urbanism from the Politehnica University of Timișoara (Romania), Studio Technogeographies from Design Academy Eindhoven (Netherlands), and Borders & Territories Studio from TU Delft (Netherlands). A selection of students' projects were subsequently developed for the *Atlas of Distances* exhibition.

These initiatives directly address educational institutions, deepening the appreciation of the design and design education's multidisciplinary, collaborative, and experiential capacities that bring together embodied and material knowledge with intellectual and academic knowledge. However, this pedagogical impulse, to inspire re-analysis and reimagination of contemporary systems, extends to the entire Bright Cityscapes programme.

Design for possibilities

The Bright Cityscapes programme encompasses what is to me three key aspects of design. The first is the often-overlooked design of the framework that facilitates exchange and collaboration. This backstage preparation, referred to as 'writing the programme,' involves asking questions like: What's feasible? How does it function? Where are the locations? Who are the key players? Which factories and laboratories need to be involved? What information do we possess, and what remains unknown? Do we issue an open call or make selections? These questions are all integral to the design process, as the answers shape the creation of resonant outcomes.

The second aspect of design is the multidisciplinary practice that defies easy definition. It originates from diverse positions and cultures, with each practitioner bringing their unique understanding, media, and application. This type of design fosters engagement in various contexts and opens up new possibilities. These possibilities are reflected in the title of the final exhibition, *Turn Signals—Design is not a Dashboard*.

The third dimension of design involves aggregating individual practices into collective thinking with the potential to influence institutions or future policies. This concept underpinned Bright Cityscapes' exploration of the connections between design and the city as a nexus. It recognises that design thrives when individualities exist in close proximity and become visible. When the implicit and invisible design of a large-scale system interacts with designers and when designers collaborate with each other on a common subject.

In Bright Cityscapes, this synergy occurs when *Mirroring the Ecosystem* is juxtaposed with *Turn Signals—Design is not a Dashboard*, when 'A Lexicon of Orientation' is presented alongside collaborative projects, or when individual participants come together in the exhibition space, joined by companies, workers, engineers, the public, and the municipality. This collaborative ethos extends to the online platform and the accompanying publication, which use various media to enable the download of content and information for use in proximity to other practices, both in Timișoara and beyond.

In my opinion, if we truly want to facilitate designers in addressing the complex questions of today, it is imperative to transcend the boundaries of curatorial, organisational, and design approaches. An environment that enables individuals to work next to each other within specific contexts while embracing diverse perspectives must be cultivated.

This is what Bright Cityscapes has sought to establish, evident in its numerous layers and outcomes. It is also reflected in this publication, which is intentionally presented as a work in progress, rather than a final product. This approach allows us to retrace the journey we embarked on as a team, recognising this project as a constellation of collaborations intertwined across different moments and contributing agents. It invites us to recognise Bright Cityscapes as an opening.

Generous reciprocity

By understanding the entire Bright Cityscapes programme as design, each conversation, each opening, each research, each piece of work, become a signal for a turn in direction. A turn in how Timișoara is understood and designed, in how productive and open exhibitions can be created, in how we work together and collaborate on new knowledge, and in how we understand design's role in our everyday life. It is for these reflections that I am grateful to commentators from within Timișoara and Romania, and from beyond.

In conclusion, I would like to recognise the remarkable generosity that permeated the programme, and which everyone deeply valued. This culture of generosity across collaborations, institutions, and disciplines was instrumental in making the programme a reality, and is not to be taken for granted. It is a testament to how Bright Cityscapes was conceived and executed for the city of Timișoara, through the collaboration between UPT, FABER, the factories, and, of course, the participating designers. My hope is that this spirit of generosity endures, an open invitation to contribute to this vibrant context.

Martina Muzi
Curator Bright Cityscapes

1. Groundwork —opening doors of economic agents

Reflections on Programming a Process

INTERVIEW 06.10.2023

The Bright Cityscapes programme is the result of a collaboration between Politehnica University Timișoara (UPT) and independent cultural centre FABER. In this interview general coordinators of the project, Loredana Gaiță (UPT) and Oana Simionescu (FABER), are joined by curator Martina Muzi. They reflect on how the conditions of the programme's emergence—collaboration and a thirst for knowledge—determined its evolution and outcomes, which aim to expand the notion of design in Timișoara.

The creative and collaborative complexity of the Bright Cityscapes programme is not something that Timișoara has experienced before. How did this programme come about?

Loredana Gaiță The Bright Cityscapes programme was conceived to develop a fresh perspective on the city. Equally, the realisation of the programme itself is the result of a different way of looking at the city.

One year before Timișoara became European Capital of Culture 2023, there was a noticeable absence of local entities capable of undertaking a large-scale programme such as Bright Cityscapes. The curators responsible for the Capital of Culture sought to bridge this gap by instigating a collaboration between the Politehnica University of Timișoara (UPT) and FABER. It has been an ideal solution to the challenge, as it brought together an institution capable of supporting such a programme, while also tapping into local expertise and creative energy essential for infusing the project with artistic excellence.

The collaboration worked not only because of institutional synergies. Bright Cityscapes was driven by a necessity to develop an understanding of contemporary Timișoara. Both myself and Oana are architects who have been involved in numerous civic and cultural initiatives in the city, which gave us a keen awareness of its development and its pressing needs. Based on this experience, we immediately understood that in order to foster a deeper understanding of the city, we needed to go beyond local myths and impressions. Developing scientific and statistical knowledge—through the research of Norbert Petrovici—became foundational, not only for bringing the audience closer to the project but also for enabling the meaningful academic collaborations that underpin many of the design projects.

It is striking to observe that collaboration and knowledge, which are core to the Bright Cityscapes programme, were founding principles for the initiative. Another core aspect of Bright Cityscapes is design. What was important about emphasising design as a discipline that goes beyond mere aesthetics or illustration?

Oana Simionescu In our effort to construct a broader perspective on design, our primary objective was to highlight the potential of creativity to facilitate diverse potentials and perspectives. At FABER, we consistently grapple with a fundamental question: 'Why are the creative endeavours we pursue relevant and essential, and how can we ensure their connection to the unique realities of our city?' Driven by this question, we are constantly exploring how to generate products, programmes, and ideas that not only resonate within our specific local context but also extend their relevance beyond that. Bright Cityscapes sought to address this very question by establishing bridges, not only the institutional ones that Loredana has already mentioned, but also bridges connecting diverse practitioners, various perceptions of Timișoara, and a wide array of knowledge and methodologies.

Timișoara, being Romania's second most industrially significant city, is predominantly inhabited by engineers. Consequently, the role of UPT holds significant importance within the city. Bright Cityscapes' major aim was to establish connections with the academic realm and collaboratively bring to the forefront concepts and innovations originating from academic thought, experimentation, and research.

The challenge we faced was substantial. It involved the task of linking all this information and involving key stakeholders within a global and cultural context, while also conveying the intricacies of these collaborative efforts and research through a set of exhibitions. Linking this knowledge to the pragmatic and economically-driven industrial world needed to be done using a language that conveyed accessible and compelling stories, all of which were tied to global urgencies and concerns.

The exhibition Mirroring the Ecosystem *was based on visiting and observing the insides of factories typically not accessible to an outside audience. It included artefacts from the production lines, photographic documentation, infographics, and unique exhibition furniture made from assembly line elements. How did this exhibition set the stage for the Bright Cityscapes programme?*

Martina Muzi For me, *Mirroring the Ecosystem* was approached as more of an intervention than an exhibition. It was required that we open the Bright Cityscapes programme with an exhibition, and based on our aspirations for the programme to be research driven, we could not start with a final exhibition. So instead, *Mirroring the Ecosystem* was built around establishing a statement of intent; sharing with the public what the programme wanted to consider, and its different layers and scales. The project was based on quite literally opening the doors of the UPT laboratories and various factories. Together as a team, we visited these places, asking bold questions: What is design? What is happening here? What should we be looking at? They then lent us objects, components and materials from their assembly lines that we presented in the exhibition.

It was also an opportunity for us to start a conversation and establish relationships with these companies. Simultaneously, the initial research from the commissioned economic report came in, positioning Timișoara within a global import-export network, and this information was presented at the exhibition in the form of infographics. Effectively, the exhibition also opened the doors to reveal the process of the programme to the public.

OS By presenting these artefacts in the curated context of an exhibition framed by photography, infographics, and other layers, it was not just those objects that were on display, but the narratives around the objects that came into focus—the people that make them, their constituent parts, and how they emerge from complex international networks.

By taking the time to herald this formative aspect of Timișoara, the exhibition also really opened doors throughout the subsequent process. For the factories and companies, it was quite a surprising result. I remember the employees visiting the exhibition and experiencing great joy at seeing their products in such a completely different context and format. There was also a lot of curiosity among local visitors because we were exhibiting what is made in Timișoara in closed, inaccessible factories, and thus remains otherwise unseen.

LG After showing at FABER, this exhibition also travelled to UPT and created more interesting moments. On the one hand, the engineers, teachers and students at the university were introduced to a diverse range of components. On the other, in this new curated context, the familiar objects looked completely different. This raised numerous questions about the nature of these objects, and leading from there the impact of the companies on the local social fabric. Most importantly, a conversation was started regarding why these objects are not only something to sell, but also something through which to reflect on larger discussions regarding knowledge, work, and the city.

In an interview, Petrovici mentioned that he was struck by how responsive people were to his research as a way to see present-day Timișoara. Besides opening doors, the exhibition and economic report also played a role of 'mirroring' or showing Timișoara back to itself. This seems to be a significant motif across the programme development, research process, and curation?

OS One of my hopes for the project was to gain a better understanding of the deep industrial nostalgia people in Timișoara have, and to encourage detaching ourselves from the past to focus more on the city's present and future.

Various companies that no longer exist are often regarded with great sentimentality, and their architectural remnants revered. However, discussions rarely engage with the contemporary economic landscape and the major role that industry plays today. Both the *Mirroring the Ecosystem* exhibition, and the economic report by Petrovici and team, 'Economy in Timișoara: Territorial Distribution of the Economy in the Timișoara Metropolitan Area', did an excellent job in addressing this by looking at the present-day economy in a forward-thinking, positive manner. The entire programme was geared toward shifting our focus away from the past and toward the future, but this is an ongoing task.

LG From the standpoint of the UPT, nowadays local companies are deeply intertwined with the university; they serve as long-term partners and a significant majority of our graduating students directly enter these local companies or even join them before graduation. This connection is quite strong, but it can also pose certain challenges. Bright Cityscapes explored the evolution of the relationship with these companies. Through visiting various companies, we posed questions that they might not be accustomed to and might not necessarily want to answer.

Through this, we stepped outside of the typical collaboration between the university and the companies, where companies occasionally sponsor laboratories or social activities in exchange for the university promoting their company to attract students.

Instead, Bright Cityscapes introduced students and academics to a more reflexive perspective on what the companies do and where they fit into the local production ecosystem. By altering the perspective on these companies, not merely as employers but also as local actors with an impact on the city, for better or for worse, it also aimed to make both students and teachers more aware of the complex dynamics in different domains.

MM From the perspective of the design discourse, industrial design often starts by understanding how industry functions, produces, and operates, not just locally but also in relation to other places.

It was surprising for me to see the vastness of the manufacturing sector in Timișoara and wonder where the designers fit into this equation. This emphasised the importance of reopening the conversation between

different places, as industries vary in importance depending on the locality.

Many companies and industrial processes have their origins in the west of Europe but have manufacturing hubs in the east. This dialogue between places and skills is vital within the current design discourse, which is increasingly linked to concerns surrounding the environment, climate, social responsibility, and ethical work practices. While design in the west often becomes more theoretical, it's crucial to reconnect it with the reality of production, especially when that reality is geopolitically distant. The challenge of accessibility always comes up when talking about researching industrial systems and the impact of large companies. I found Timișoara to be a place that still offers accessibility to explore these complexities, because manufacturing still involves humans, materials and resources.

While the concept of manufacturing is something found in all countries, in Timișoara it is still accessible to designers, and this is an opportunity for design research to remain humble, and to understand how things function, even on the scale of a factory floor. This engagement was fundamental for Bright Cityscapes, not only for the knowledge it generated about Timișoara, but for the designers more broadly. This is an international opportunity that can be further developed into potential future iterations of this project.

The relationship between the international and local in the Bright Cityscapes programme has a particular quality. On the one hand, the programme is fiercely local, emergent from and developed for Timișoara, and employing various situated research and design approaches. On the other, creating connections with international designers, audiences and contexts has also been paramount. What was the thinking behind this strategy?

LG As we stated from the beginning, we wanted to better understand how the city works. Only relying on local practitioners would not have given us a very objective result. Rather, drawing on a multiplicity of professionals and people working in all sorts of environments can expand our views and understanding.

MM Exactly, it can be called 'international', but it was more about having people with different backgrounds, practices, and lenses, in order to ask: How does looking at the city of Timișoara, the research compiled about it, and the information it holds, reveal different things through different lenses?

By introducing designers and practitioners with a variety of origins and practices into the project, distances are created from which problems and questions can be understood differently. These distances can happen within and across different cities, institutions, networks and collaborators, and can open up new understandings and insights. These distances also start to build a design discourse, as they elevate the questions we have about Timișoara to be reflected on beyond a particular territoriality.

OS Creating a connection between the local and the international is also a response to the themes of the programme and research—the globalisation of industry and the economy. Connecting the local reality with international realities through a design discourse seemed like a natural way to approach the programme, given our research objectives.

MM Yes, in terms of building design discourse, it's important that the questions we have about the city can be read beyond a particular territoriality. Although this can be difficult in just one round of a programme, it was fundamental for us to ask and explore how the project can be more impactful than just a performative action. As such, it became important to be very grounded within the local environment and networks, while also establishing exchanges across an international network.

These distances were traversed through numerous conversations and collaborations. Collaboration, as we have already discussed, gave birth to the programme, and became fundamental to it. How were the collaborations with designers structured and what has been their impact?

LG The formalised collaborations between four UPT professors and four designers was one of the fundamental aspects of the programme. Through an open call in UPT, professors applied to be part of the process, and we had an individual discussion with each of them to explore the potential. Four were selected, and Martina matched them with designers.

From the university's perspective, this was the most significant aspect of the programme, because it addressed a key concern: the lack of ways to communicate scientific processes, both with the public but also between people working within universities. As such, the researchers who participated gained greatly in terms of their professional work and teaching, and have reported having gained significant insights through the process.

For collaborations between designers and larger departments, it was not only professors but also colleagues and even students who have been exposed to a way of working and thinking that challenges their expected understanding of their profession and knowledge. Through these collaborations, as well as the exhibitions hosted, the academic community has expanded its understanding of design as a way of researching and understanding specific issues and global phenomena.

OS This is true not only for UPT, but for everyone involved explicitly and implicitly in the project. Whereas previously design might have been understood as a quality that needs to be added to beautify or make playful, now design is understood as something that can facilitate insight into complex processes, and as something that can facilitate expansive collaborations across contexts and disciplines.

These collaborations stretched from factory floors to campus laboratories, and created a bridge between people and situations of multiple scales. We had designers working with teams of engineers or factory workers, others collaborating directly with international and local archives to access complex data. These people all have a different notion of design and its impact after this project.

I really enjoyed the feedback from some of the researchers who collaborated with designers. Versavia Ancuța said that her profession is really precise, looking at details and solving very specific problems. Working with information designer Cinzia Bongino really opened her perspective on the power of asking broader questions. This inspired her to rearrange and restructure information to look at the bigger picture, in order to get a better initial understanding. She has already incorporated this insight into how she teaches. This is one specific anecdote that speaks directly to this ability of design to tackle complexity, rearrange things, expand possibilities, and lead to diverse answers.

Please explain to us the thinking behind the exhibition Turn Signals—Design is not a Dashboard*, and its title.*

MM The title is a bit of a play on words, but also indicates what is meant by design within the entire programme: exploring what we do and don't know, and the process of exploring what we could potentially know.

The concept of signalling is used in many different sciences to explain how information is transferred between different systems. In the context of manufacturing and production, this concept can be used to describe how information between two parties is communicated and interpreted to facilitate understanding and collaboration.

When looking at the different design projects in the programme, as well as the economic report that was commissioned, a lot of questions came up about how to access information, how to collect information, what the meaning of data is, what the value of subjective and objective information is, and how to share information with other designers, researchers and collaborators.

The economic report in particular is very dense and dry. Design, on the other hand, is no stranger to embracing poetry and other means of engagement to make complex positions accessible. This is how we came to recognise that the idea of sending, receiving, and reinterpreting signals is important. Given that the manufacturing and automotive industries have such a strong presence in the programme and in Timișoara, a connection was drawn between the concept of signalling information and the indicators on automobiles with which one signals information about turning left or right.

Thus, the exhibition and its title reflect the idea of design as a discipline that doesn't have one answer, but is instead a search for questions across different layers of reality. The multiplicity of the discipline is what is referred to by the subtitle, 'design is not a dashboard'. The dashboard as an interface, but also as an electronic component and everyday object that presents itself as a solution. Design is still sometimes seen as an object or a solution, but the design explored in the *Turn Signals* exhibition, and the Bright Cityscapes programme as a whole, sought to expand the possibility of design beyond this definition.

OS The exhibition represents how our commitment to design being the linchpin in our challenge—of generating knowledge, mediating collaboration, and speaking to the broader public of Timișoara—really paid off. We observed that visitors to the exhibition showed a genuine curiosity to delve deeper into the programme and the individual projects. They often inquired about a platform that would allow them to further explore and comprehend the rich tapestry of the exhibition's narrative.

LG Yes, we had a lot of enthusiastic visitors. Their deep engagement with the exhibition is also due in part to the mediation programme, which facilitated a real bridging between generations. There was a programme especially for children, and we had many classroom groups coming through the show. There was also a special mediation programme for company workers, and another one for elderly people. The mediation team really sought to tell the story of the projects and exhibitions in as many different ways as possible, to meet as many different types of audiences. It was also designed in such a way that the audiences' responses became part of the content of the exhibition itself. Thus, while the designers showed Timișoara back to itself, the audience showed design back to us.

This complex and dynamic programme is no ordinary curatorial project. What was the thinking behind all of these different elements—original academic research, designer collaborations with academics, residencies for international designers, educational programme, and more—and how were they orchestrated to all come together?

MM I consider curation as the art of designing a system for activating design. To me, curating is not merely about selection, but more importantly, it's about fostering possibilities. To achieve this, one must first comprehend the very nature of those possibilities.

At the outset of this project I sensed a twofold challenge: making the outcomes accessible and understandable, while also ensuring that the programme and structure provoked discourse and innovation within the design community. Adding to this complexity was the fact that the European Cultural Capital bid book contained many words fundamental to design—words such as 'technology', 'city', and 'community'.

However, in creating interesting projects we cannot simply accept these terms at face value. Thus, the curatorial approach to the project necessitated a way to question the essence and definition of these terms in the context of Timișoara.

What emerged was the development of a research-based programme that explored the manifold meanings of research, challenging conventional definitions and expert perspectives. It involved pushing beyond the comfort zones associated with factories, universities, and major institutions. Collaboration came to play a central role within the design processes, as well as in developing the programme itself.

This raised questions about how to facilitate collaborations between experts and designers; the formats in which designers could collaborate, such as residencies; and the vital school programme, which needed to develop formats to facilitate different tutors and institutions working together, while promoting collaboration among students.

In essence, the curatorial approach was to create a testing ground for various strategies. While a single strategy, such as a residency approach or institutional collaboration, might have simplified matters, the aim here was to design a system that allowed design to be explored, tested, and hopefully shared.

What was the importance of the education programme—which included not only the formal elements of the Atlas of Distances Workshop and Atlas of Distances *exhibition, but also informal dimensions—within this testing ground for various strategies?*

LG There is an obvious emphasis on education in the programme, in the sense that the university is the main stakeholder. Consequently, education has been of utmost importance since the programme's inception, when we began visiting the laboratories at the university. This continued through the open call for professors who sought to experiment with new forms of collaboration with designers, in order to present their work to the general public in novel ways.

Additionally, there was a more explicit educational intervention through the collaboration between the Faculty of Architecture at UPT (Romania), Studio Technogeographies from Design Academy Eindhoven (Netherlands), and Borders & Territories from TU Delft (Netherlands)—the Atlas of Distances workshop and exhibition. The fact that we brought together these three academic institutions with such diverse teaching methodologies, including collaborations between students from different backgrounds, was a significant step in advancing the programme's goals. In particular, it created an exchange that increased the awareness of the programme's international scope among all involved. However, it's worth noting that education is deeply ingrained in the very essence of the Bright Cityscapes programme, which is built on the foundation of asking questions and learning from them. The *Mirroring the Ecosystem* exhibition at UPT, for example, raised questions about the nature of exhibitions and the methods they can employ.

Throughout the programme, questions about Timișoara, its driving forces, its socioeconomic complexities, and other aspects have led to productive learning and outcomes. Another pivotal question at UPT has been about research and the roles of researchers. How does research shape the university? What does collaboration mean? What are the companies in Timișoara engaged in? How do they operate? These are just some of the questions posed, directly or indirectly, through Bright Cityscapes. While others may hold a different perspective, I believe that education is the central focus of this programme, rather than design.

MM I think that is a very beautiful insight. Perhaps I see the lens of design first, only because design and education are deeply intertwined in my practice. Perhaps it is design's role to play the initiator, and the result and communication are akin to education.

That said, I do think it's important not to understate the significance of the formal education initiatives of the programme, because there are questions surrounding how to develop relevant education in design schools, the doors to knowledge that different educational strategies and collaborations can open, and the ability for students to learn to collaborate in the name of new insights. Asking these questions is an important practicality.

OS I agree, and would emphasise one thing: that the final step of the formal educational programme, in which a select group of students who participated in the Atlas of Distances workshop were supported in the further development of their work for exhibition, was particularly impactful. For me, it was really beautiful to witness how the students transformed their work into a new form, and how they personally developed through the process of reformatting their project for a different context and audience.

Linking the educational component to the exhibition platform really gave students an opportunity to experience vital lessons, regarding growing from being a student to a young professional in a context with high expectations.

There's the official ways that the programme lives on, but also the unofficial ways, which we have discussed in terms of how the project has impacted so many people and institutions in so many different ways, and will continue to impact more people and institutions through that. How has it impacted you and what are the future intentions for the programme?

OS For us, FABER, it has had an immense impact as it is the first consistent programme that we have had. Before this, we only dreamt of doing something on such a scale. It has been a great achievement in all possible ways and I'm optimistic about developing the programme further. I think we can consolidate and build bridges around the topic of design, and continue to constellate a relevant context and discourse for professionals to contribute to.

LG For UPT, it has also been a valuable programme, the first of its kind. In a national context in which student

numbers are declining, as international universities can offer more than local ones, the need for competitive offers, new experiences, and novel types of learning has become essential.

This goes not only for students, but also for researchers and teachers. Moreover, in the climate of a general public scepticism of science that is not only local but global, the programme's ability to reintroduce the role of science in all sorts of processes, and bring it to a human scale through a gentle and fun approach, is something that needs to grow and replicate in the future.

MM As curator and educator it has been a dream to have the possibility to implement such complexity within a programme, and simultaneously give space to projects, events, and exhibitions that are accessible, entertaining, provocative, and forward thinking.

As far as I'm concerned, projects never finish regardless of how they are finalised for a specific circumstance. So far, Bright Cityscapes has been the result of exploring Timișoara in 2023, and comes from a peculiar set of collaborations and participation.

Given the nature of the project, the fact that it is presented as open knowledge, touches on urgent questions, and crosses places and design approaches, there are many possibilities for continuing it. This includes the possibilities of expanding the research towards places, people, and systems that have not yet been included.

We hope to keep the conversation going through the online platform and the printed publication.

The Work Geography of Timișoara

INTERVIEW 31.07.2023

Co-author of the 'Economy in Timișoara: Territorial distribution of the economy in the Timișoara Metropolitan Area' report, Norbert Petrovici discusses how Timișoara's historical spatial design and economic factors produce its ways of working, commuting, and designing.

In order to understand design's significance in Timișoara, Bright Cityscapes needed to understand how the city's economic systems produce its everyday life. Petrovici was invited to conduct original research that investigates the economy of Timișoara using data-driven and anthropological research. The study aimed to identify the main forces shaping the city's economy, including worker movements, employment trends, turnover, ownership, and the impact of foreign and local investments. This research provided valuable insights into the city's industrial heritage and its current economic sectors.

The resulting report—'Economy in Timișoara: Territorial distribution of the economy in the Timișoara Metropolitan Area'—draws on statistical and archival research to delve into the forces that shape employment, worker movements, and the overall dynamics within the city. It considers how the city's current economy and identity is impacted by the historical legacies of the interwar economy of 1918–1948, socialist economy of 1950–1989 and the economic restructuring of 1990–2021. Closer analysis into the current economic system within Timișoara particularly focuses on labour migration and commuting, and ownership networks.

With a background in urban studies, economic sociology, and social statistics, Petrovici brings a wealth of expertise to the analysis of Timișoara's economy. Currently affiliated with the Department of Sociology at Babeș-Bolyai University, he specialises in urban/regional sociology and social theory, focusing on the political economy of the socialist city. He co-authored the report with Vlad Alexe and Vlad Bejinariu of the Interdisciplinary Center for Data Science, which Petrovici heads. In this interview, Petrovici discusses some of the key outtakes of the report.

The 'Economy in Timișoara' report plays the crucial role of situating the design research of the Bright Cityscapes project within the complexities of the geography and everyday functioning of the city. How did you go about this significant body of original research?

Norbert Petrovici I collaborated with a team, including an historian and anthropologist. To explore Timișoara's history, we primarily drew on archival research. While the historian studied the interwar and pre-World War I periods, my focus was on socialism. Further, to gain a comprehensive understanding of the economy, I leveraged my existing research working with statistical data, as well as doing new analyses of official data from the National Institute of Statistics, including microdata, to uncover the local, regional, and global dynamics of the economy. Additionally, we conducted 50 interviews with workers and managers, which are currently being analysed.

Contrary to my expectations, the historical research in particular received significant recognition and garnered interest from a broader audience. This highlights the importance of the historical aspect in shaping Timișoara's identity, particularly in relation to its economy. The historical context also provides valuable insights into divergent stages of the city's development, particularly notable were 2002 and 2011, when other Romanian cities outperformed Timișoara by attracting advanced value-added businesses.

The report especially considers the spatial dynamics of the labour market and in relation to the socio-economic characteristics of Timișoara. What were some of your key insights regarding Timișoara's geography of work?

NP I examined immigration patterns in Timișoara based on individual census data from 2011. While I lacked specific data on daily commuting, I found that Romanian companies, particularly in manufacturing, rely on labour arbitrage. However, Timișoara and Romania are experiencing a demographic decline that poses challenges to continuing to find cheap labor in order to sustain its export-oriented business model. What is also significant, is that in Romania and Bulgaria, low-wage labourers from rural areas are typically able to supplement their income with agricultural resources. In the case of Timiș County and Timișoara, there are some differences. While cities like Cluj have a similar number of blue-collar workers, most of them are located in greenfield areas outside the city. In Timișoara, most of the manufacturing sector is within the city, which is a distinct characteristic of its development.

This means that in Timișoara, approximately half of the blue-collar workers commute daily from rural areas to work. This commuting pattern is unique compared to other parts of Romania, where rural-to-rural commuting or

commuting from second and third-tier cities to rural areas is more common. In Timișoara, the labor force from rural areas commutes to the city for work. In contrast, in the business service sector, which consists of highly educated white-collar workers, they also work in the city but tend to live in nearby green localities. So, you have this interesting suburban dynamic where workers who are not strictly rural live in suburban houses or flats but work in the city in business services.

The report also analyses the impact of socialism on the economy of Timișoara, which is your personal specialisation. How has socialism in particular affected Timișoara's economy?

NP Based on my prior research, my argument is that socialism had two pillars for economic development. Firstly, it focused on investing in local production chains and creating shorter chains. This means that they when a factory was developed or planned in a region, there was also a focus on ensuring that the necessary raw materials were available in that region. There were also were centrally located factories that aimed to cover the entire national state space, but their primary goal was exporting. Timișoara played a significant role in this context, particularly because during the interwar period, it had a strong foreign economic influence due to its history as part of the Austro-Hungarian Empire before World War I. In the interwar period, Timișoara had the highest number of workers employed by foreign direct investment companies. During socialism, investments were made to connect these companies after nationalisation and create new factories that formed interconnected short production chains. This process began in the 1950s and 1960s when various multinational companies in Timișoara were nationalised. Notably, there was a specific focus on specialisation in textiles, art chemicals (such as painting), and leather industries, which were linked to beekeeping, animal husbandry, and agriculture in Timiș County.

Secondly, with these industries thriving during socialism, from the 1970s onward, the strategy shifted towards adding value to global production chains. The chemical sector became particularly important in the 1970s, coinciding with Romania's entry into the International Monetary Fund. Timișoara benefited significantly from this sector, as did other regions in Romania. However, I find it especially intriguing because it originated from the textile sector, which received increasing investments to transform into the chemical industry during the 1970s and 1980s. Another sector that received more investments during socialism was non-ferrous metallurgy, which became part of the machinery production chain. Notably, Timișoara was the first city in Romania to have a factory investing in computer production.

During the 1990s, these production chains underwent significant transformations. The successful factories were either returned to their former private owners before socialism, which was the case in Timișoara. Consequently, Timișoara became the first city to attract substantial foreign investments during the 1990s, far surpassing others.

Foreign investments have significantly contributed to shaping the city's economic landscape over time. What were some key factors that attracted foreign investments to Timișoara?

NP In addition to the restitution of factories, Timișoara benefited from two other important factors. Firstly, Timișoara, as part of the Habsburg Empire, had strong connections and a diverse ethnic background that left during socialism and returned later, resulting in the presence of influential Italian and especially German communities, along with other parts of Romania.

Secondly, Timișoara, specifically Timiș County, received substantial funding during socialism, leading to significant advancements in agriculture, particularly in terms of technology and large-scale farms. The agricultural sector was highly developed and had strong ties to factories through efficient short production chains for raw materials. In the 1990s and 2000s, Italy specialised in agricultural exports, particularly in the southern region. This presented excellent opportunities due to Timișoara's high level of mechanisation and vast land resources.

Consequently, the Italian community initially benefited from the local value chains in the agricultural sector and became the most significant investment community in Romania, especially in Timișoara. They were followed by the German expatriate community, who also established organised interests and invested in industry. The German capital primarily focused on the automotive sector, while the Italian investors played a crucial role in industries such as textiles, which were closely linked to agriculture, particularly wool, and the chemical sector.

What role does design play in the Timișoara economy?

NP One specific aspect of Timișoara and other second-tier cities is that they have managed to negotiate a somewhat better technological upgrade after integrating into the European Union. Timișoara, in particular, has experienced a remarkable boom in engineering. There is a company employing 5,000 white-collar workers, 95% of whom have higher education degrees. However, they are not designers in the traditional sense. There are plenty of jobs available, but the field of design, especially object design, is not well-developed. In many cases, design tasks are performed by engineers within the companies, resulting in a slightly different approach to design. This often involves UI design for web pages or various forms of user experience (UX) design. However, classical object design in Timișoara is not yet fully integrated into global value chains. While it is an appreciated field, it has not reached the same level of development as other aspects of the city's industry.

One key point is that Timișoara focuses on exporting intermediate products rather than final goods. We don't make the final products here; instead, we produce capital goods or intermediate products used in the final assembly, which often takes place in countries like Germany or Italy. It is highly unlikely for Timișoara to have the entire design

process within its boundaries unless there is a complete transformation of global value chains. In that case, the semi-peripheral regions like Romania could handle the final assembly work while keeping marketing and other aspects elsewhere. Alternatively, Timișoara could participate in the offshoring of business processing. This scenario involves having designers working in offices that serve as call centers, effectively offshore or externalised operations. However, this would mean that either Timișoara can capture highly value-added processes, or it becomes a destination for degraded value-added work shifted from countries like Germany, Austria, Netherlands, or Italy to Eastern Europe.

You've mentioned the chemical, farming, and engineering industries is key in shaping Timișoara. Are there any others that have significantly contributed to the economic development of Timișoara and the region?

NP Certainly, the automotive industry is a key sector for Romania and Timiș County. It is closely linked to Timișoara's economic growth and will be discussed in detail in an upcoming addition to the report. In the 1990s Romania was able to secure favourable deals with global businesses, particularly in the automotive sector, through privatisation and negotiation efforts that—unlike other sectors—preserved the entire local national production chain. Timișoara was already part of the local production chain, with companies like Elba producing components for car manufacturers like Dacia. Major players like Continental and Bosch have established offices and engineering teams in Timișoara, contributing to its economic growth. The engineering sector, classified as manufacturing, encompasses design, engineering processes, and business processing outsourcing services within companies, ranging from accounting to engineering design.

How has Romania's membership in the European Union impacted the industries you have studied in Timișoara?

NP Eastern European countries, including Romania, have become significant manufacturing hubs since joining the European Union. The business service sector has also experienced substantial growth, particularly in cities like Prague, Warsaw, Bucharest, Sofia, and a few second-tier cities such as Brno, Cluj, and Timișoara. Each city has its own specialisation, such as engineering in Timișoara and ITC in Cluj. Since joining the EU 15 years ago, the manufacturing sector has grown to become one-third of Romania's GDP. What is strange is that the number of employees in manufacturing has not seen a significant increase. This can be attributed to increased productivity and technology. What is also noteworthy is that as the EU has outsourced to Romania, its manufacturing has downsized and pollution has decreased. Meanwhile, Romania is now experiencing a significant increase in pollution due to the outsourced manufacturing. While it has made the European Union greener as a whole, the impact on the local economy and employment is complex and requires further examination.

What do you think are the challenges and opportunities facing the economy of Timișoara in the future?

NP The report does not specifically look to the future, but based on the findings, I believe Timișoara's capacity to diversify its economy lies in smart specialisation within its existing sectors. Instead of trying to mimic Cluj, which is seen as a more developed second-tier city focusing on the ICT sector, it would be more beneficial to prioritise the development of the engineering sector. This could involve areas such as automation, robotics, and advanced capital goods for production. Balancing policies to support both the startup sector and attracting foreign direct investment (FDI) is important, but relying solely on labor arbitrage and cheap labor is not a sustainable approach. It would require significant investments in public transportation to facilitate commuting, which can be costly. Instead, Timișoara should focus on attracting foreign companies in the technological field, particularly those specialising in mobile robotics and automation. However, I still need more time for reflection and discussion with others to provide a more concrete recommendation.

Significantly, the report has led to discussions with Vice Mayor of Timișoara Ruben Lațcău and managers, revealing the critical role of collaboration in advanced technological sectors, such as manufacturing, engineering, and design, for the city's multinational manufacturing sector. However, Timișoara currently lacks the necessary expertise in these areas. To shape Timișoara's future, it is crucial to bridge the gap between the startup sector and foreign direct investment (FDI) by establishing connections between the technological and FDI sectors. While some former managers and owners have invested in the tech sector, there remains a disconnect between technology-driven initiatives and FDI.

In addition to this report, you are also still processing additional research. What will this cover?

NP There are a number of articles still under development. The first is based on 50 interviews with workers and managers. These are based on the observation that in other areas of Romania rural commuters are able to rely on agricultural resources to supplement their income. However, in Timișoara this is less possible due to the particular urbanisation of the Timiș area. Particularly the systematic arrangement of city blocks and shared yards by the Austro-Hungarians resulted in the aggregation of agricultural land for industrial production, with a strong orientation towards export. As a result, the rural areas of Timiș, although they may appear rural, are highly urbanised and function as neighborhoods of Timișoara.

Visiting Laboratories as Sites of Knowledge Economy

INSIGHT 15.07.2023

The laboratories at the Politehnica University of Timișoara (UPT) are specialised facilities where scientific research and experimental development transpire in various fields. Here, researchers, educators, students, and engineers conduct experiments and analyses to deepen their understanding of natural phenomena, create new technologies, and contribute to scientific research.

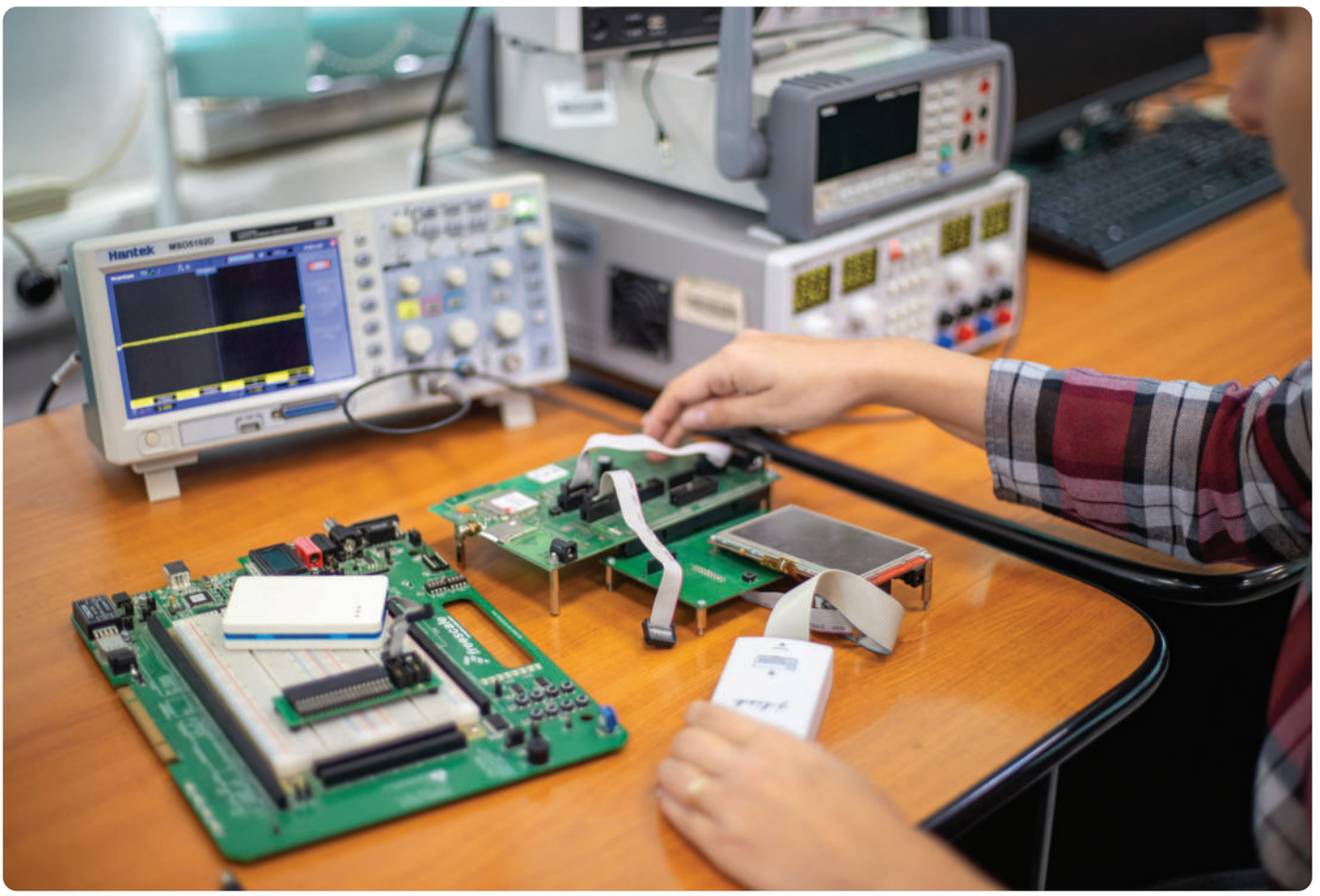
The manner in which the knowledge generated in these laboratories plays a crucial role in Timișoara's economy, was a key research area for the Bright Cityscapes programme. The establishment and enhancement of these laboratories often arose in response to the demands of the economic environment in the western region of the country, with substantial financial backing from economic partners.

The historical relationship between the university and local industries has been deeply intertwined, with local businesses providing significant funding since the university's inception in 1920. The growth of UPT is a testament to this collaboration.

Historically, the city lacked a local knowledge producer, leading individuals in this region to seek education in Vienna or Budapest due to historical ties to the Austro-Hungarian Empire. After 1918, when Romania became a modern state, the need for the city's own university to train local professionals for the city's factories became crucial.

Today, the economic landscape demands applied research, often through collaboration contracts for testing new solutions, solving problems, and providing specialised consulting services. Industrial research in

High Voltage Laboratory, Faculty of Electrical and Power Engineering



Digital Signal Processing Laboratories (DSPLabs), Faculty of Automation and Computing

UPT's laboratories frequently relies on research grants obtained from national or European competitions. Notably, over a quarter of the university's research funding comes from contracts with Romanian companies.

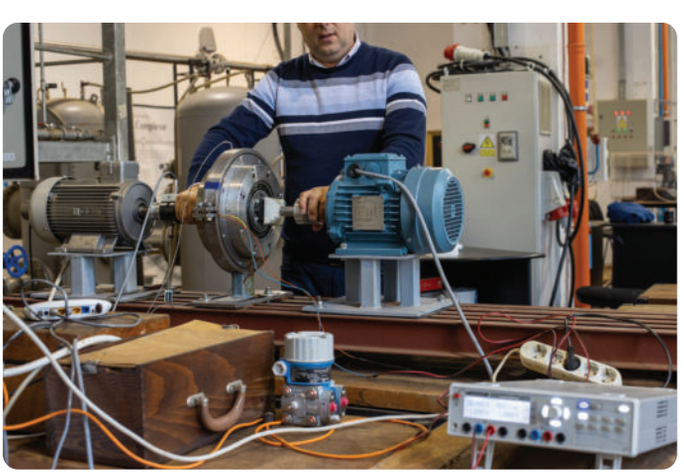
UPT has a strong reputation for research in areas such as energy, environment and climate change, engineering sciences, information communication technology, space and security, eco-nano technologies and advanced materials, bioeconomy, applied life sciences and biotechnologies, and computer science, but also in mathematics, economic sciences, and health.

In order to understand the role of UPT and its laboratories in Timișoara's knowledge economy and geography through embodied and relational terms, the Bright Cityscapes team conducted intensive laboratory visits, engaging with as many of the university's laboratories as possible in two seperate two-day visits. These visits involved succinct interactions where laboratory leaders condensed their research into impactful summaries.

The Bright Cityscapes team posed bold questions about the role of laboratory's activities, and their areas of focus, leading to enriching conversations. For instance, a laboratory researching electrical batteries for buses sparked discussions about public transport connectivity and urban design. Research into hydropower led to conversations about water usage in various landscapes. Similarly, research on the reuse of asphalt after road demolitions prompted discussions about material transformation and its applications.

These are but some of the many interactions that contributed to the Bright Cityscapes team fostering an understanding of Timișoara's knowledge ecosystem, as well as the academic structure of the university. By physically opening the doors of the laboratories, the visits became intimate moments, allowing participants to closely relate to the activities and research trajectories within the individual labs.

The visits also gave insights into how to establish a collaboration between UPT researchers and international

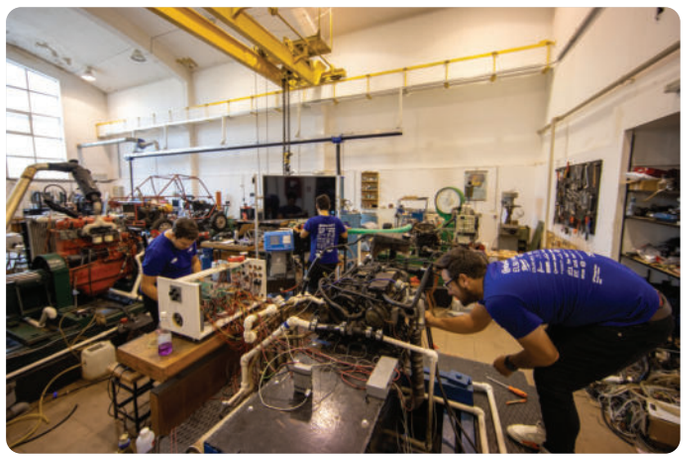


Laboratory for Hydraulic Machines, Faculty of Mechanical Engineering

designers. The necessity and structure of an open call became clear, thanks to the visits. This resulted in the open call reaching researchers whose interest in design resonated with the Bright Cityscapes approach, which made matching researchers with designers more conducive to successful collaborations.

The visits also familiarised the university and its community with the programme, becoming the initial contact point for most candidates who later applied for the open call. There was also interest and curiosity sparked, resulting in an enthusiastic reception of the subsequent exhibitions.

In all, the visits to the UPT laboratories were pivotal in building trust, and in demonstrating that the programme encompassed numerous aspects of city knowledge and processes at various scales.



Engine Laboratory, Faculty of Mechanical Engineering

Formula Student Workshop, UPT Racing

Laboratory of Steel Structures, Faculty of Civil Engineering

Factory Visits —A Photographic Reportage

VISUAL ESSAY 17.02.2023

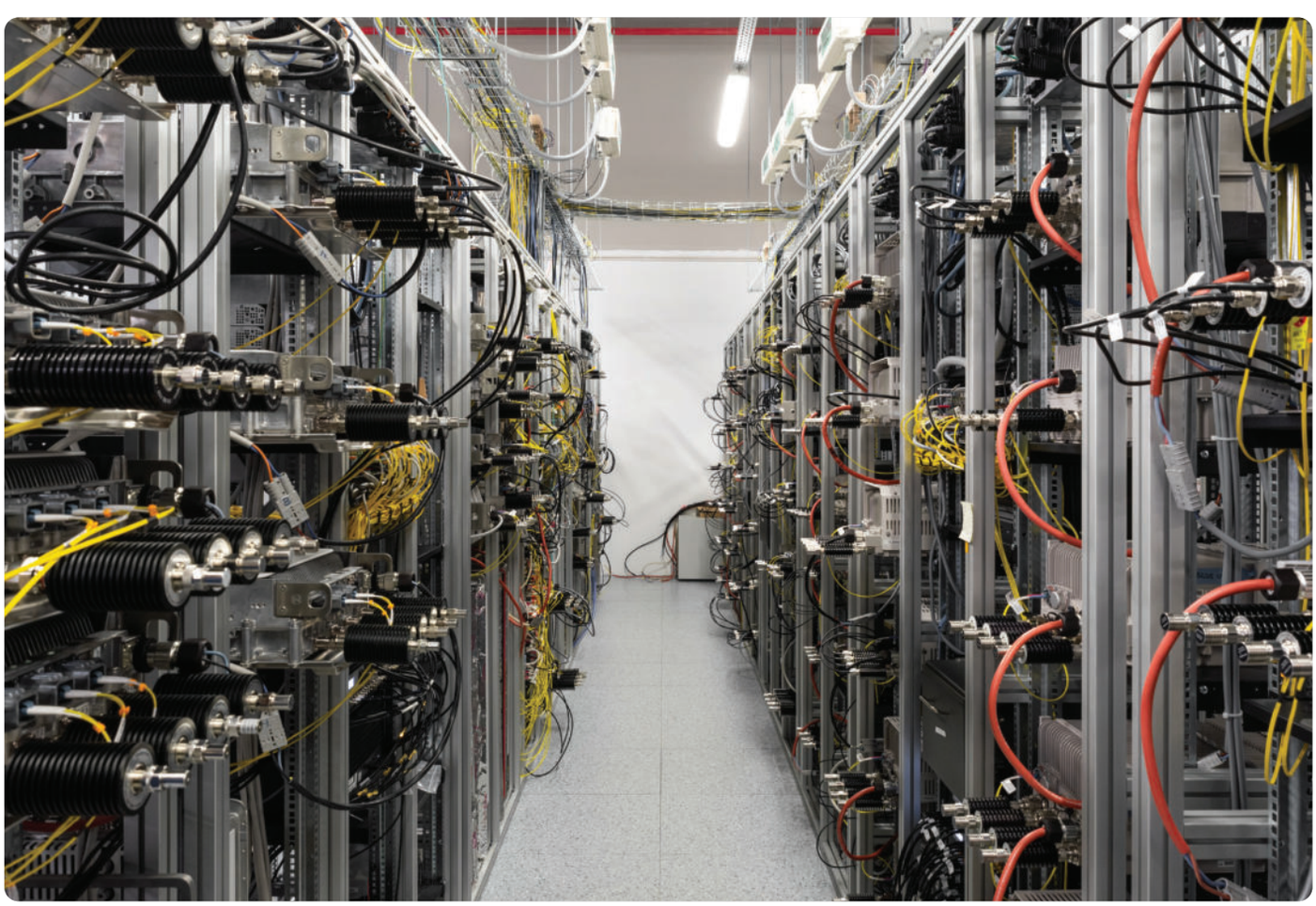
For the exhibition *Mirroring the Ecosystem*, Bright Cityscapes commissioned Romanian photographer Marius Vasile for a photographic reportage. The task involved the documentation of three important industrial sites in Timișoara: Nokia Romania, Flex Romania, and Azur. Each industry is crucial for the city's and region's industrial ecosystem. The reportage aimed to shed light on the infrastructure underpinning these industrial giants, often hidden and unknown to the general public.

The images of Nokia's industrial site, a leading telecommunications company, document its data center for the creation of 5G; a technology that has transformed global communication.

Similarly, the images from Flex, a global manufacturing service company, offer a window into various operational modules. With a footprint in sectors as diverse as automotive, medical, and communication, the photographs capture some activities within the company's walls.

The Azur series, on the other hand, provides a glimpse into a chemical industry specialising in the production of resins, composites, paints, and coatings. The images show various facets of the operation, from the liquid nitrogen area to the solvent-based coatings laboratory.

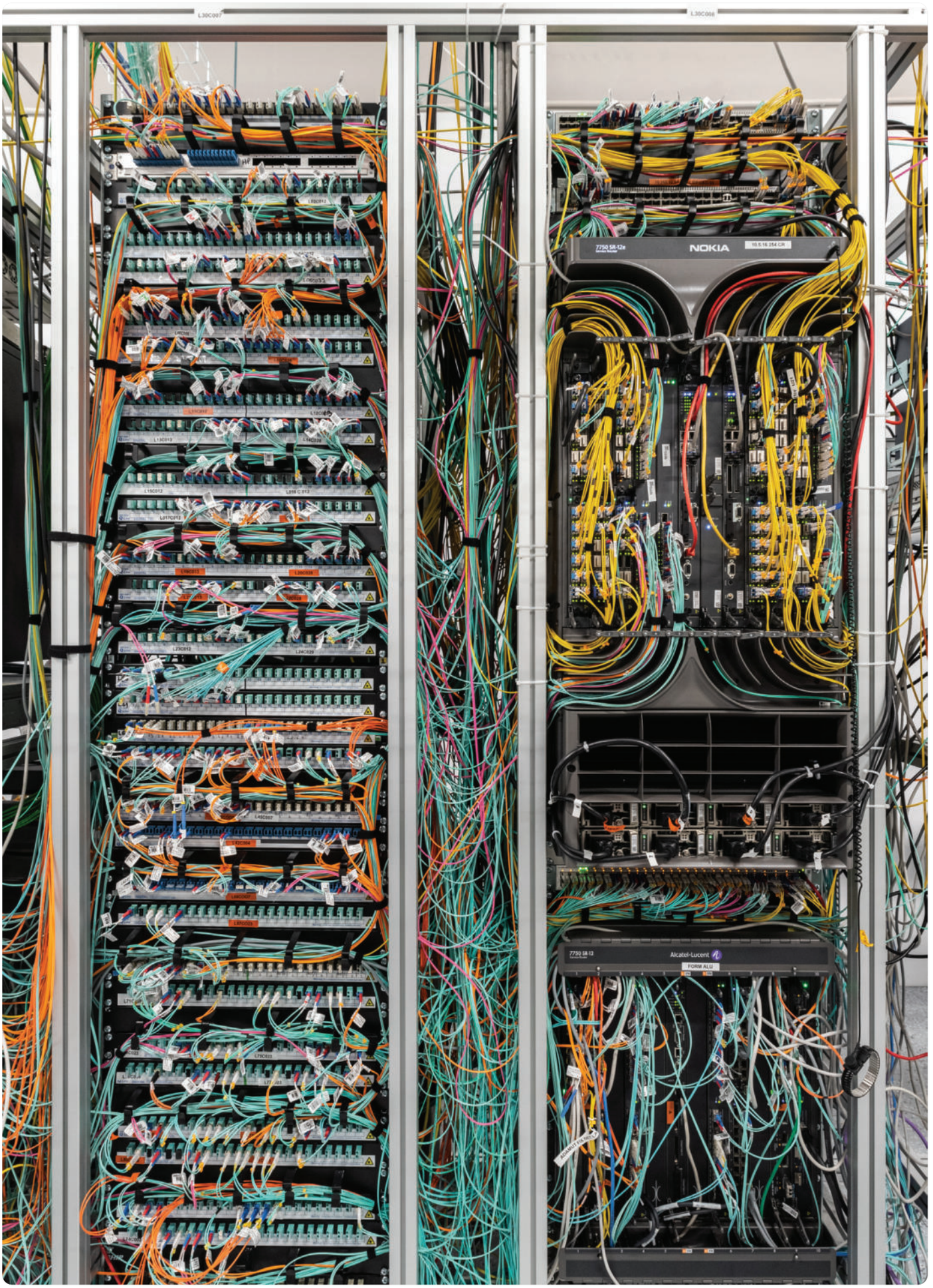
Credits
Photography: Marius Vasile



Nokia

Flex

AZUR

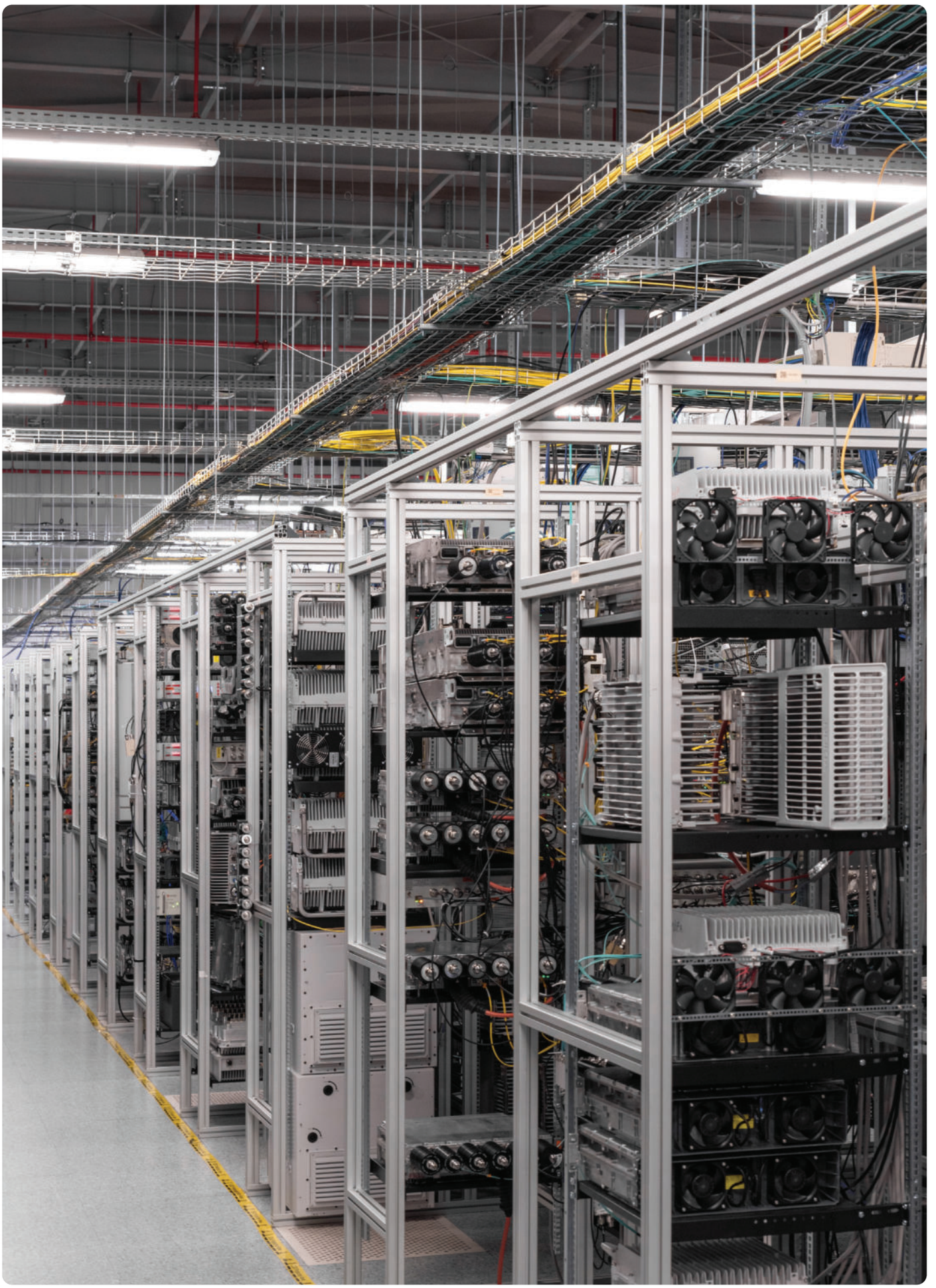


Nokia

Flex

AZUR

Flex



Nokia

2. Mirroring the Ecosystem

Mirroring the Ecosystem

EXHIBITION 17.02–02.04.2023

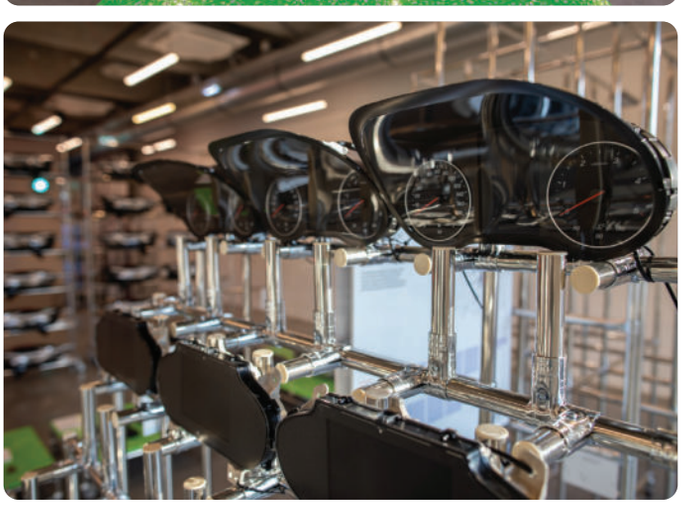
What is design in Timișoara? What kind of economy does design produce in Timișoara? Addressing these questions, the *Mirroring the Ecosystem* exhibition went behind the closed doors of the city's factories to amass an inventory of its skills, data, places, technologies, and products. From 17 February to 2 April 2023, the findings were presented as a preview of Bright Cityscapes's ongoing and multifocal research into Timișoara's economy.

The exhibition space brought together data-driven research, object collections, manufacturing components, resources and photographic documentation. Mundane objects of different function, form and substance, were borrowed from manufacturing companies. Components were extracted from their assembly lines and presented in their temporary state before being hidden inside complex technological objects. Resources and leftover materials were presented in their raw state before their application or transformation phase.

Photographs shared views to inaccessible spaces like factory floors, where workers, machines and various infrastructures are in operation 24/7 behind closed doors. Information graphics contextualised the most relevant assets of the local economy, not only presenting a portrait of the city in relation to its turnover, employees and distribution, but also linking its main companies to the large import-export network that starts, crosses or ends in the metropolitan area of the city.

The entire installation was produced within the local industrial hubs of the city. The exhibition set reconsidered the traditional furniture of factory assembly lines to accommodate the material and visual elements of the research. Designed as a modular system mirroring the repetition and standardisation within the global manufacturing industry, this overall composition served as a foundation for contemplating the contemporary interdependence of local and multinational production forces.

As the concept of mirroring in social science is an unconscious behaviour of imitation from one being to another, the exhibition can be read as a reflection board, an inventory and a tangible interconnection of skills, data, places, technologies, and products. As a whole, the exhibition reflects on the state of design in the city and its role as invisible or visible discipline fundamental to the local economy in connection to global supplies or demands.



Curator
Martina Muzi

General coordination team
Oana Simionescu (FABER)
Loredana Gaiță (UPT)

Exhibition production team
Anabella Costache
Bianca Schick

Exhibition assistants
Karola Kalapati
Mihai Moldovan
Cristina Potra Mureșan
PlanZERO

Graphic Design
Federico Santarini
Kirsten Spruit

Research team
Norbert Petrovici (coordination)
Vlad Alexe (data science)
Vlad Bejinariu (history)
Ágota Ábrán (organisational ethnography)
Andrei Herța (organisational ethnography)
Macrina Moldovan (organisational ethnography)

Photo reportage
Marius Vasile

Program team
Cristian Blidariu
Diana Caducenco
Victoria Cociotă
Alexandru Luca
Ionel Mărgineanu
Ema Prisca
Roxana Sîrbu
Florin Unguraș
Mihaela Tilincă

Exhibition documentation
Seba Tataru
Petru Cojocaru

Collaborators from companies

AZUR
Marc-Andre Fritsche
Alina Perdivară
Adriana Vrâncuț
Veronica Oros
Adrian Nistor

Dräxlmaier
Iulian Antonie
Eugeniu Arabagi
Lucian Bosoi
Alexandru Doran
Oana Panait
Sebastian-Cristian Poelincă
Violeta Robu
Alin Stoi
Nicolae Todea

Elba
Cristian Mucenicu
Alexandru Sere
Amalia Torok

Flex
Florin Asavei
Miladi Bobîrsc
Igor Bulavitchi
Costel Calagiu
Dan Calicean
Florin Drăgan
Ovidiu Erina
Alexander Klein
Mirco Miucin
Ovidiu Morariu
Diana Năstase
Sonya Oprișa
Cristina Tath
Sorin Teleptean
Adelin Trandafir

Gelcoprod
Ovidiu Covăsală

Nokia
Florin Costin Ciocan
Andreea Constantin

Continental Automotive Timișoara Team

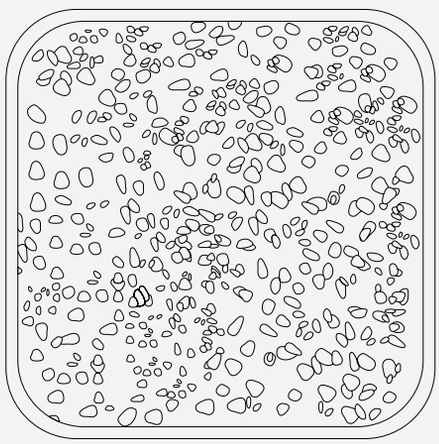
Mirroring the Ecosystem —Objects

COLLECTION 17.02.2023

Green sand —for Evrika Pro Mosaic

Evrika Pro Mosaic is used to provide decorative coatings inside and outside of buildings. It is especially recommended for finishing walls in high traffic areas, such as staircases, window and door reveals, hallways and corridors. The plaster is durable, resistant to water, weather conditions and the action of algae and fungi.

Courtesy of AZUR



Final product: MOZAIC plaster
Components: aqueous acrylic dispersions, hydrophobic agents, additives, dyed quartz aggregate in different colours

Production year: 2023
Production rate: ten hours/3250 kg
Production line workers: one chemical operator

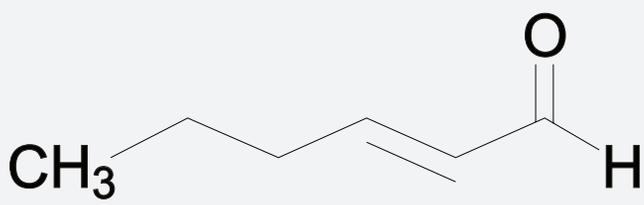
Client industry: general constructions/real estate developers
Throughout (part/year): 42 000 kg/year

IMPORT / EXPORT
Product section: XIII. Articles of stone, plaster, cement, ceramic, glass, and similar materials
Industry: Nonmetallic Mineral Product Manufacturing

Trans 2 Hexenal

Trans 2 Hexenal is a type of organic compound that is used in a variety of applications. It is a colourless to pale yellow, sharp, green, and apple-like-smelling liquid. It is typically used as a flavouring agent in food and beverages, and it is also used in perfumes and cosmetics. Trans 2 Hexenal is also used in the production of polymers and plastics and as a solvent in the printing industry.

Courtesy of AZUR



Final product: flavours and fragrances
Components: organic components

Production year: 2023
Production rate: 70 hours/1000 kg
Production line workers: three chemical engineers and three chemical operators

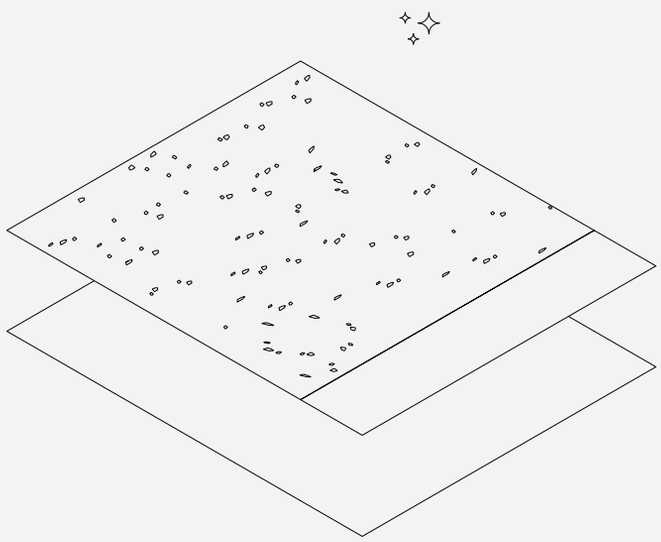
Client industry: flavours and fragrances companies
Throughout (part/year): 220 000 kg/year
Export destination: UK

IMPORT / EXPORT
Product section: VI. Products of the chemical industry
Industry: Manufacture of Chemicals and Chemical Products

Self-levelling epoxy floor

Evrika Pro self-levelling epoxy floor is used in civil and industrial constructions with an aesthetic appearance and high resistance to wear and chemical environments. Applied areas: hospitals, pharmaceutical industry, food industry, public and commercial spaces, office buildings, covered parking lots, warehouses, archives, garages, schools, kindergartens, fitness rooms.

Courtesy of AZUR



Final product:	concrete flooring
Components:	epoxy resin, hardener, pigments, additives, fillers.
Production year:	2023
Production rate:	six hours/700kg
Production line workers:	two chemical operators
Client industry:	general constructions/ real estate developers
Throughout (part/year):	20 000 kg/year

IMPORT / EXPORT

Product section:	VI. Products of the chemical industry
Industry:	Manufacture of Chemicals and Chemical Products

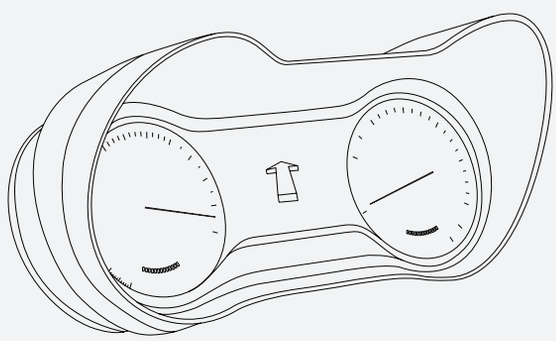
Instrument cluster with pointer

An instrument cluster with pointer shows vehicle operation, speed, fuel, oil and multimedia system level and status. The interface consists of dials and a monitor that is connected to the car's computer where information is transmitted via icons and alerts.

Instrument cluster without pointer

A car instrument cluster without pointer (digital) houses the various displays and indicators that allow the driver to drive the vehicle. All the indicators such as speed, fuel, oil and multimedia system level and status, are displayed as numerical parameters, text messages or graphical instruments. Unlike pointer instruments, they have interactive displays that are more versatile and flexible.

Courtesy of Continental Automotive Romania



IMPORT / EXPORT

Product section:	XVII. Vehicles aircraft vessels and associated transport equipment
Industry:	Manufacture of Motor Vehicles, Trailers and Semi-Trailers

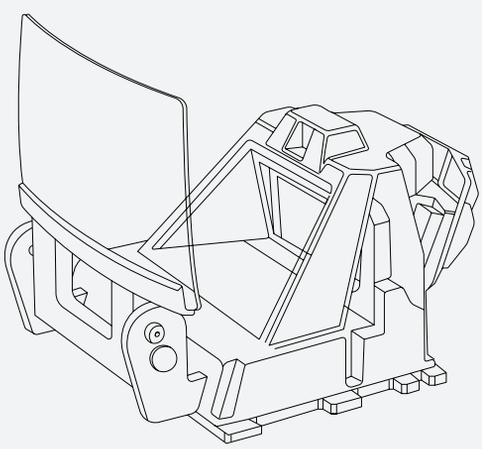
Head-up display

The head-up display generates a virtual image that is projected through the windscreen into the driver's field of vision. Warnings, important driving information and selected functions from driver assistance or multimedia systems can be read without taking the driver's attention off the road.

Display solutions

Digital instrument cluster and central digital display show car status and additional navigation and communication information. In-vehicle cameras monitor the driver's level of vigilance.

Courtesy of Continental Automotive Romania



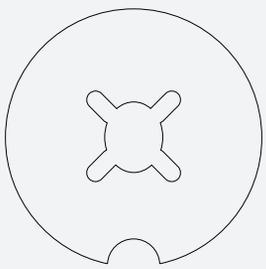
IMPORT / EXPORT

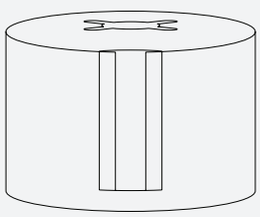
Product section:	XVII. Vehicles aircraft vessels and associated transport equipment
Industry:	Manufacture of Motor Vehicles, Trailers and Semi-Trailers

Head closing

A head closing in aluminium is a type of industrial component used to seal the ends of pipes or tubes. It is made out of aluminum and is round in shape. It has a flange at one end which is designed to fit into the end of a pipe or tube, creating a tight seal. Head closings in aluminum are commonly used in plumbing, automotive and aerospace applications.

Courtesy of GELCO PROD





Components:	aluminium
Dimensions:	Ø30×14.5 mm
Production year:	2023
Production rate:	720 sec
Production line workers:	one CNC operator
Client industry:	automotive
Throughout (part/year):	5000/year
Export destination:	Romania

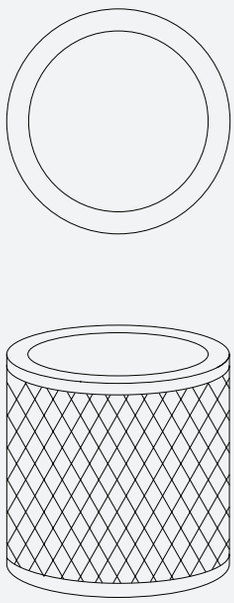
IMPORT / EXPORT

Product section:	XV. Base metals and articles of base metal
Industry:	Manufacture of Fabricated Metal Products, Except Machinery and Equipment

ACT socket

An ACT socket is a type of electrical connector used in automotive applications. It is designed to be resistant to corrosion and vibration, making it suitable for use in harsh environments. It is made out of stainless steel and is generally quite small. It is used to connect electrical components such as sensors and relays, and is a common component in modern automotive systems.

Courtesy of GELCO PROD



Components:	inox
Dimensions:	11×7 mm
Production year:	2023
Production rate:	120 sec
Production line workers:	one metal lathe operator
Client industry:	energy
Throughout (part/year):	20 000/year
Export destination:	Romania

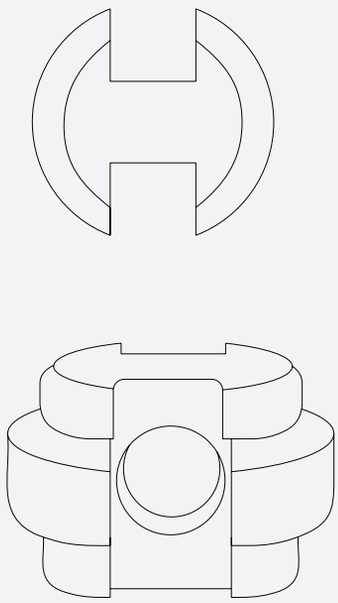
IMPORT / EXPORT

Product section:	XV. Base metals and articles of base metal
Industry:	Manufacture of Fabricated Metal Products, Except Machinery and Equipment

Collet 8

A collet 8 is an automotive part used to secure components into place. It is made out of brass and is small in size. It is typically used to secure small parts such as nuts, bolts, and screws. It works by clamping down and holding the component in place, allowing it to be securely attached to another part. Collet 8s are commonly used in automotive, aerospace, and mechanical engineering applications.

Courtesy of GELCO PROD



Components:	brass
Dimensions:	8×7.5 mm
Production year:	2023
Production rate:	30 sec
Production line workers:	one metal lathe operator
Client industry:	automotive
Throughout (part/year):	300 000/year
Export destination:	Romania

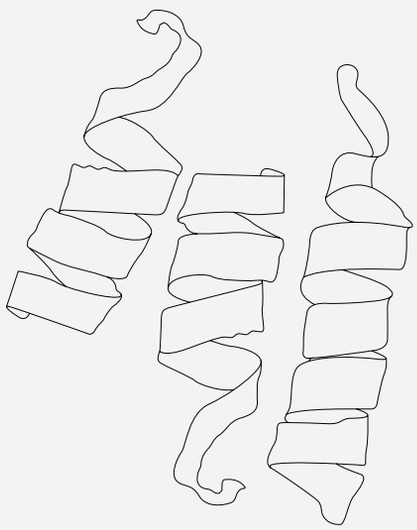
IMPORT / EXPORT

Product section:	XV. Base metals and articles of base metal
Industry:	Manufacture of Fabricated Metal Products, Except Machinery and Equipment

Scrap metal

Scrap metal is metal that has been discarded or recycled from its original use. It is the combination of waste metal, metallic material, and any product that contains metal capable of being recycled from previous consumption or product manufacturing. It is typically made from iron, steel, aluminium, copper, and other metals. Scrap metals have a high market value, with their ability to be re-used again and again. It is used in various applications, including manufacturing, construction, and automotive parts.

Courtesy of GELCO PROD



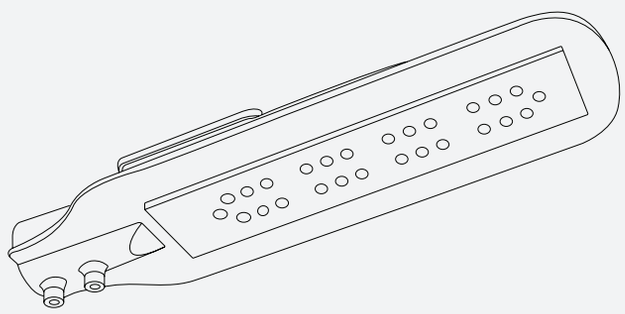
IMPORT / EXPORT

Product section:	XV. Base metals and articles of base metal
Industry:	Manufacture of Fabricated Metal Products, Except Machinery and Equipment

Butterfly LED streetlights

Butterfly LED street lamps are a type of streetlight that uses LED technology to provide illumination. LED-based street lights offer reduced energy consumption, longer lifetime, and lower maintenance costs for major, local, and secondary roads. Ideal for the replacement of street lights with compact fluorescent lamps, sodium lamps or metal halide lamps. Butterfly LED street lamps are typically made from aluminium and have a design that resembles a butterfly.

Courtesy of Elba



Dimensions:	395×135×56 mm
Production year:	2023
Production rate:	30 minutes
Production line workers:	three production operators
Client names:	ELBA COM, Lumitech, Ledkonsulten, Alshaya, Betterleds, Schahleds, Inom, Tiplux and others
Throughout (part/year):	25 000/year
Export destination:	Germany, Belgium, Serbia, Sweden, Doha, Austria, Czech Republic, Italy, England, France

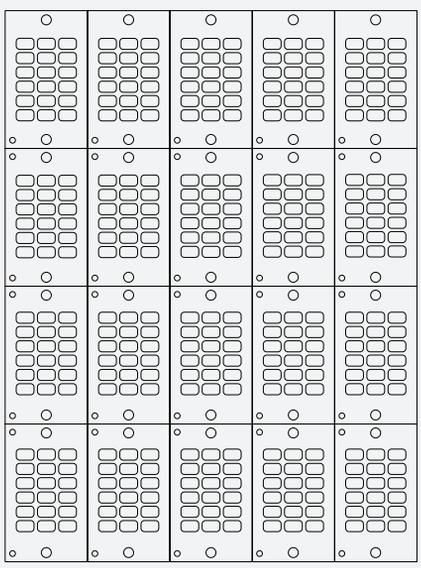
IMPORT / EXPORT

Product section:	XX. Miscellaneous manufactured articles
Industry:	Manufacture of Electrical Equipment

LED PCBA

A LED PCBA is a printed circuit board with LED chips soldered onto it. LED PCB is the core of LED lighting. It requires a heat sink for cooling and is often made of aluminium to facilitate better thermal conductivity due to its energy efficiency, design flexibility, and low build cost. LED PCBs are used in a wide range of industries, including the medical and automotive Industry, computer construction and telecommunications.

Courtesy of Elba



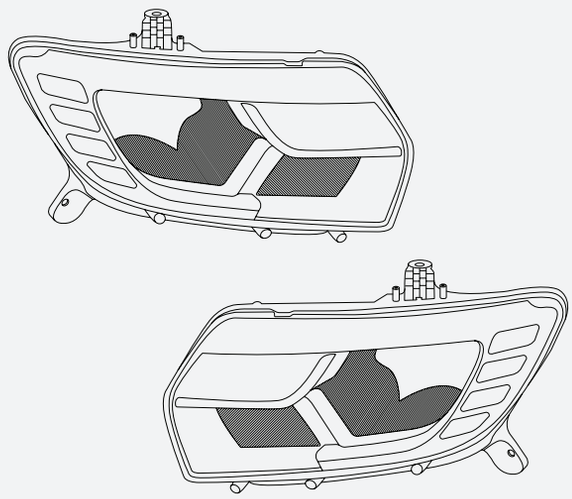
Dimensions: 5×17 cm
Production year: 2023

IMPORT / EXPORT
Product section: XX. Miscellaneous manufactured articles
Industry: Manufacture of Electrical Equipment

Headlights

Headlights are a type of automotive lighting used to illuminate the road ahead. They are typically made from halogen or LED bulbs and are designed to be bright and long-lasting. Headlights are used in various applications, including cars, trucks, and motorcycles.

Courtesy of Elba



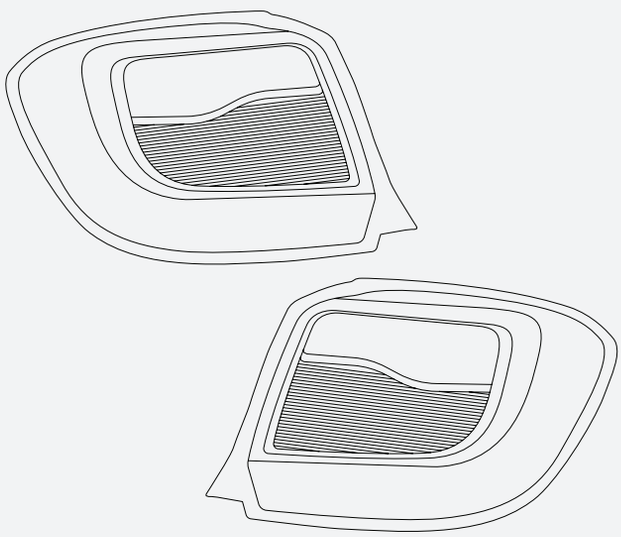
Dimensions: 60×25×33 cm

IMPORT / EXPORT
Product section: XVI. Machinery/mechanical appliances; electrical equipment; parts; sound recorders/ reproducers tv image sound recorders/reproducers parts/ accessories
Industry: Manufacture of Electrical Equipment

Tail lights

Tail lights are a type of automotive lighting used to indicate a vehicle's presence from behind. They are typically red and are designed to be visible from a distance. Tail lights are used in various applications, including cars, trucks, and motorcycles.

Courtesy of Elba



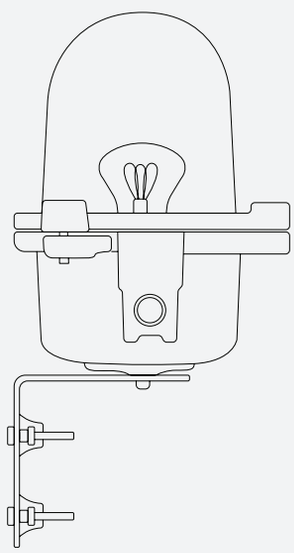
Dimensions: 43×22×26 cm
Production year: 2023

IMPORT / EXPORT
Product section: XVI. Machinery/mechanical appliances; electrical equipment; parts; sound recorders/ reproducers tv image sound recorders/reproducers parts/ accessories
Industry: Manufacture of Electrical Equipment

LBFR

The LBFR (beacon lamp with red filter) is a signal lighting unit designed to make tall structures more visible to flying vehicles. These lights can be found attached to tall structures such as broadcast masts and towers, water tanks located on high elevations, electricity pylons, chimneys, tall buildings, cranes and wind turbines. They can be mounted on buildings up to 3 000 m in altitude. The lights are arranged in clusters around the structure at specific heights.

Courtesy of Elba



Final product: street light
Dimensions: 172×70×186 mm

Production year: 2023
Production rate: 25 min
Production line workers: three production operators

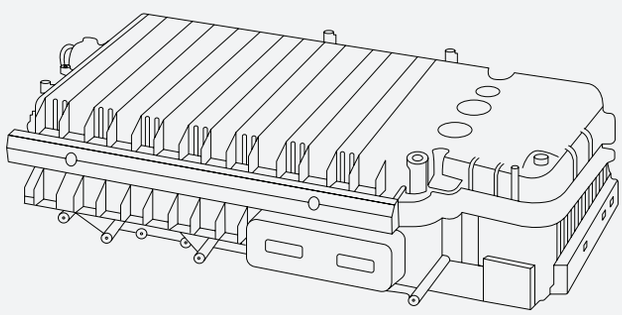
Client names: ELBA COM, Lumitech, Ledkonsulten, Alshaya, Betterleds, Schahleds, Inom, Tiplux, and others
Throughout (part/year): 5 000/year
Export destination: Germany, Belgium, Serbia, Sweden, Doha, Austria, Czech Republic, Italy, England, France

IMPORT / EXPORT
Product section: XX. Miscellaneous manufactured articles
Industry: Manufacture of Electrical Equipment

HPB80 battery (Lithium-Ion)

A lithium-ion battery (Li-Ion) is a type of rechargeable battery that uses lithium ions as the main component of its fluid. They are considered the best choice for hybrid vehicles due to their high energy storage capacity, recyclability, and quick charge time. Lithium-ion batteries are also used in various consumer electronics, such as laptops, cell phones, and digital cameras. This typology of battery system for electric and hybrid vehicles offer up to 800 volts of power, compact dimensions and meeting the highest safety requirements (ASIL D).

Courtesy of DRÄXLMAIER



Final product:	hybrid car
Components:	88 raw materials are used to assemble the battery. Li-Ion cells, cell frames, upper aluminium housing, cooling pump, S-Box HPB80 (battery control unit)
Dimensions:	4160×8150×2150 mm
Production year:	2022
Production rate:	600 sec
Production line workers:	22 adjusters
Client industry:	automotive
Client name:	Mercedes - AMG Gmbh
Throughout (part/year):	7 179/year
Export destination:	Europe, China, South of Africa

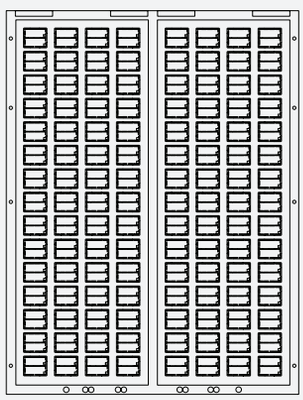
IMPORT / EXPORT

Product section:	XVI. Machinery/mechanical appliances; electrical equipment; parts; sound recorders/ reproducers tv image sound recorders/reproducers parts/ accessories
Industry:	Manufacture of Electrical Equipment

PCBA—Printed circuit board assembly

A printed circuit board (PCB) is a non-conductive material with conductive lines printed or etched on it. They are made from a combination of copper, plastic, and other materials and are designed to connect and support electronic components. PCBs are used in a wide range of applications, including consumer electronics, medical devices, and industrial equipment. A printed circuit board assembly (PCBA) describes the finished board after all the components have been soldered and installed on a PCB. The conductive pathways engraved in the laminated copper sheets of PCBs are used within a non-conductive substrate in order to form the assembly. Attaching the electronic components to the PCBs is the concluding action to create a fully operational electronic device.

Courtesy of DRÄXLMAIER



Final product:	ambient light in premium cars
Components:	16 raw materials used to be assembled in PCBA, PCBA Printed circuit board assembly, PCB Printed circuit board, Led white or/and RGB spectrum (red, green, blue), Microcontroller, Resistors, Connectors, Solder paste
Dimensions:	250×185×10 mm
Production year:	2022
Production rate:	89 sec
Production line workers:	two adjusters
Client industry:	automotive
Client name:	Mercedes Benz/LUCID
Throughout (part/year):	3 268 110/year
Export Destination:	Europe, China, NAFTA (Mexico, USA)

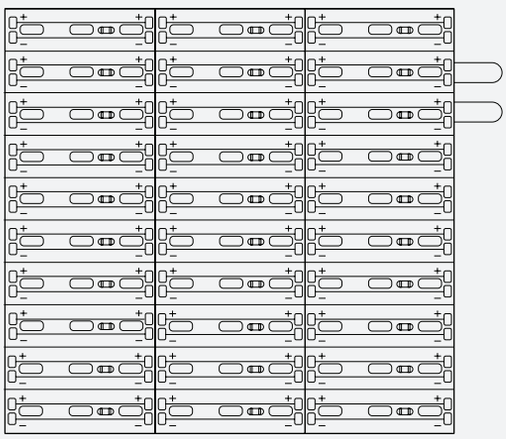
IMPORT / EXPORT

Product section:	XVI. Machinery/mechanical appliances; electrical equipment; parts; sound recorders/ reproducers tv image sound recorders/reproducers parts/ accessories
Industry:	Manufacture of Electrical Equipment

Ambient lighting

Ambient lighting is lighting used in automotive interior systems. Used for preventing driver fatigue, motion sickness, communication between the driver and vehicle and for instance and alerts. Light forges links to integrated control functions (for example touch displays) with a high level of user friendliness, based on the latest research in cognitive systems and human-technology interaction. Innovative lighting solutions with intuitive control enable seamless communication between the passenger and the vehicle, ensuring atmospheric, custom interior lighting.

Courtesy of DRÄXLMAIER



Final product:	ambient light in premium cars
Components:	20 raw materials used to be assembled in ambient light harness, PCBA printed circuit board assembly, housing, copper wires, tape, connectors, optical fibre
Dimensions:	400×200×50 mm
Production year:	2022
Production rate:	937 sec
Production line workers:	four adjusters
Client industry:	automotive
Client name:	Mercedes Benz
Throughout (part/year):	19 000 000/year
Export destination:	Europe, China

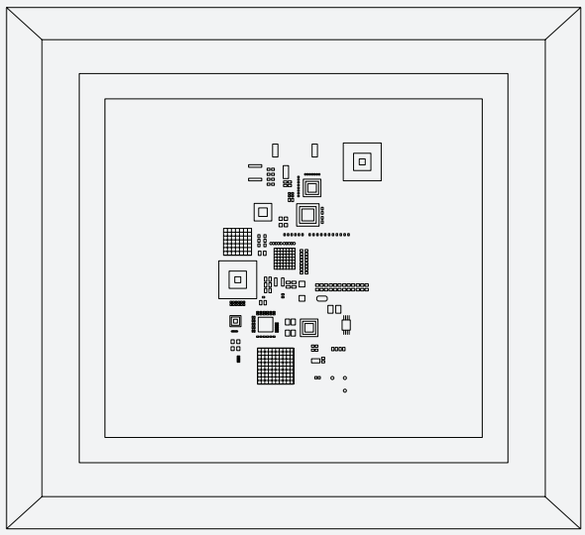
IMPORT / EXPORT

Product section:	XVI. Machinery/mechanical appliances; electrical equipment; parts; sound recorders/ reproducers tv image sound recorders/reproducers parts/ accessories
Industry:	Manufacture of Electrical Equipment

Stencil

Stencils are prototype circuit boards used for laying out electrical components securely. They help to customise circuit board fabrication. The board can function as a pre-design tool to copy the layout onto a standard PCB (printed circuit board).

Courtesy of Flex Romania



Final product:	printing tool for the electronic boards assembly production process
Components:	metal
Dimensions:	74×74 cm
Production year:	2022
Production rate:	one hour
Production line workers:	one operator (machinist)
Client industry:	electronic industry
Client name:	N/A (tools used in manufacturing process)
Export destination:	N/A (tools used in manufacturing process)

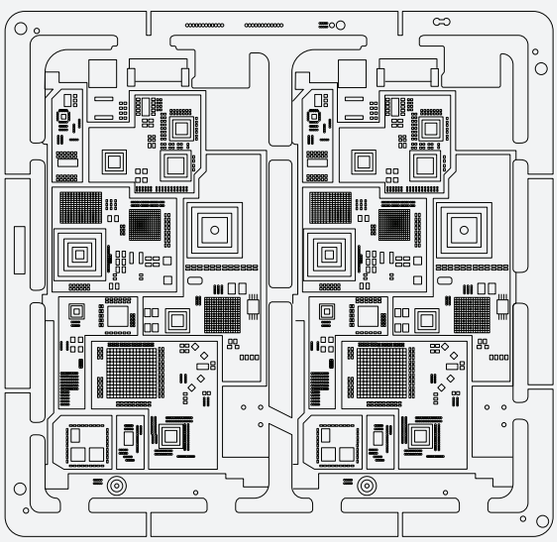
IMPORT / EXPORT

Product section:	XVI. Machinery/mechanical appliances; electrical equipment; parts; sound recorders/ reproducers tv image sound recorders/reproducers parts/ accessories
Industry:	Manufacture of Computer, Electronic and Optical Products

PCB for medical devices

Medical PCBs are printed circuit boards that are designed for use in medical devices. Medical PCBs are more reliable and efficient than traditional PCBs and are also designed to be resistant to interference. Medical PCBs are used in various applications, including medical imaging, diagnostics, and monitoring.

Courtesy of Flex Romania



Final product:	medical devices (infusion pumps and ultrasound handheld devices)
Components:	electronic components and mechanical parts (metals, plastics, cables/wires, displays)
Dimensions:	infusion pump 14×23×15 cm; ultrasound device 12×8×3 cm
Production year:	2022
Production rate:	infusion pump: four hours; ultrasound device: one hour
Production line workers:	infusion pump: 25 operators; ultrasound device: ten operators
Client industry:	healthcare industry
Client name:	infusion pump: Becton Dickinson; ultrasound device: GE Healthcare
Throughout (part/year):	Becton Dickinson: 15 000/year; GE Healthcare: 15 000/year
Export destination:	Europe

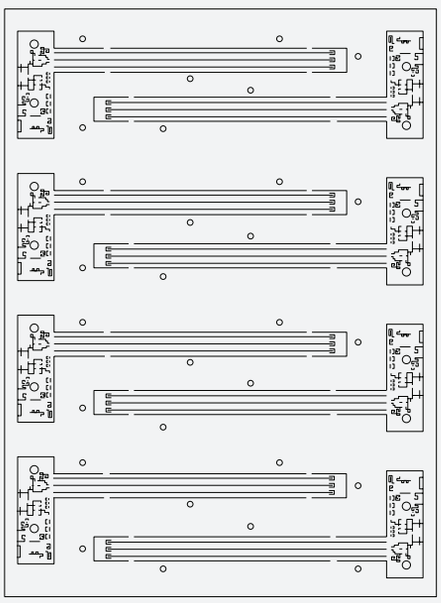
IMPORT / EXPORT

Product section:	XVI. Machinery/mechanical appliances; electrical equipment; parts; sound recorders/ reproducers tv image sound recorders/reproducers parts/ accessories
Industry:	Manufacture of Computer, Electronic and Optical Products

Flexible PCB

Flexible PCBs are printed circuit boards that are designed to be flexible and bendable. They are typically made from polyimide or Kapton and are designed to be more reliable and efficient than traditional PCBs. Flexible PCBs are used in a variety of applications, including robotics, automotive, medical devices, and consumer electronics.

Courtesy of Flex Romania



Final product:	subassemblies for steering control for the cars
Components:	electronic components
Dimensions:	25×20 cm for each panel
Production year:	2022
Production rate:	twenty minutes
Production line workers:	ten operators
Client industry:	automotive industry
Client name:	BMW i2
Throughout (part/year):	300 000/year
Export destination:	Europe

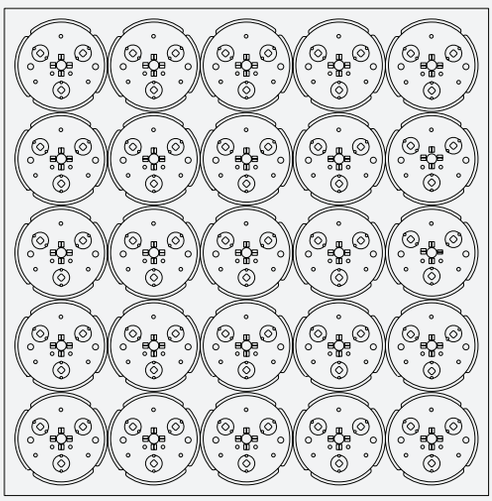
IMPORT / EXPORT

Product section:	XVI. Machinery/mechanical appliances; electrical equipment; parts; sound recorders/ reproducers tv image sound recorders/reproducers parts/ accessories
Industry:	Manufacture of Computer, Electronic and Optical Products

Solar panel inverter

A solar panel inverter or photovoltaic (PV) inverter is an electronic device that converts the direct current (DC) electricity generated by solar panels into alternating current (AC) electricity. Solar energy is one of the most sustainable sources of energy that can contribute to CO^2 emissions mitigation, being an opportunity for regions and cities transitioning to a green economy model—which means transitioning from traditional energy sources to renewable energy sources such as solar and wind. Solar panel inverters are used in various applications, including residential and commercial solar energy systems.

Courtesy of Flex Romania



Final product: solar panels systems
Components: electronic components and mechanical parts (metals, plastics)

Dimensions: 30×20×5 cm
Production year: 2023
Production rate: two hours
Production line workers: 38 operators

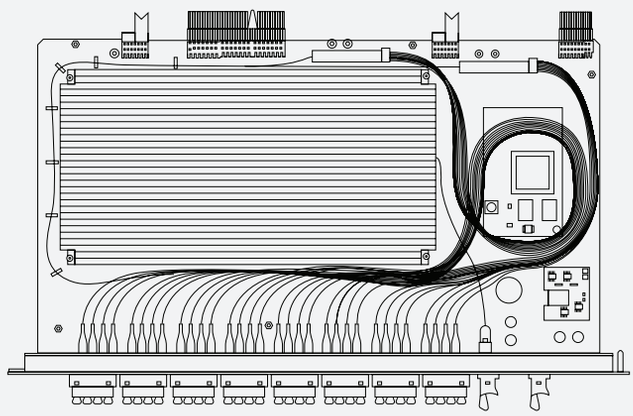
Client industry: industrial—energy industry
Throughout (part/year): 3 000 000/year
Export destination: Europe

IMPORT / EXPORT
Product section: XVI. Machinery/mechanical appliances; electrical equipment; parts; sound recorders/ reproducers tv image sound recorders/reproducers parts/ accessories
Industry: Manufacture of Computer, Electronic and Optical Products

5G PCB Board

5G PCB boards are printed circuits designed to support 5G technology. They are intended to be used in various applications, including mobile phones, routers, and base stations. They have centralised and decentralised units with broadband control units and mobile edge computing. Fiber optic cables embedded in PCBs provide higher bandwidths and reduce latency, energy consumption, and heat generation. According to industry experts, 40% of the global population will utilise 5G networks by 2024.

Courtesy of Flex Romania



Final product: data transmission and networking systems
Components: electronic components, fiber optic, mechanical parts (metals, plastics)

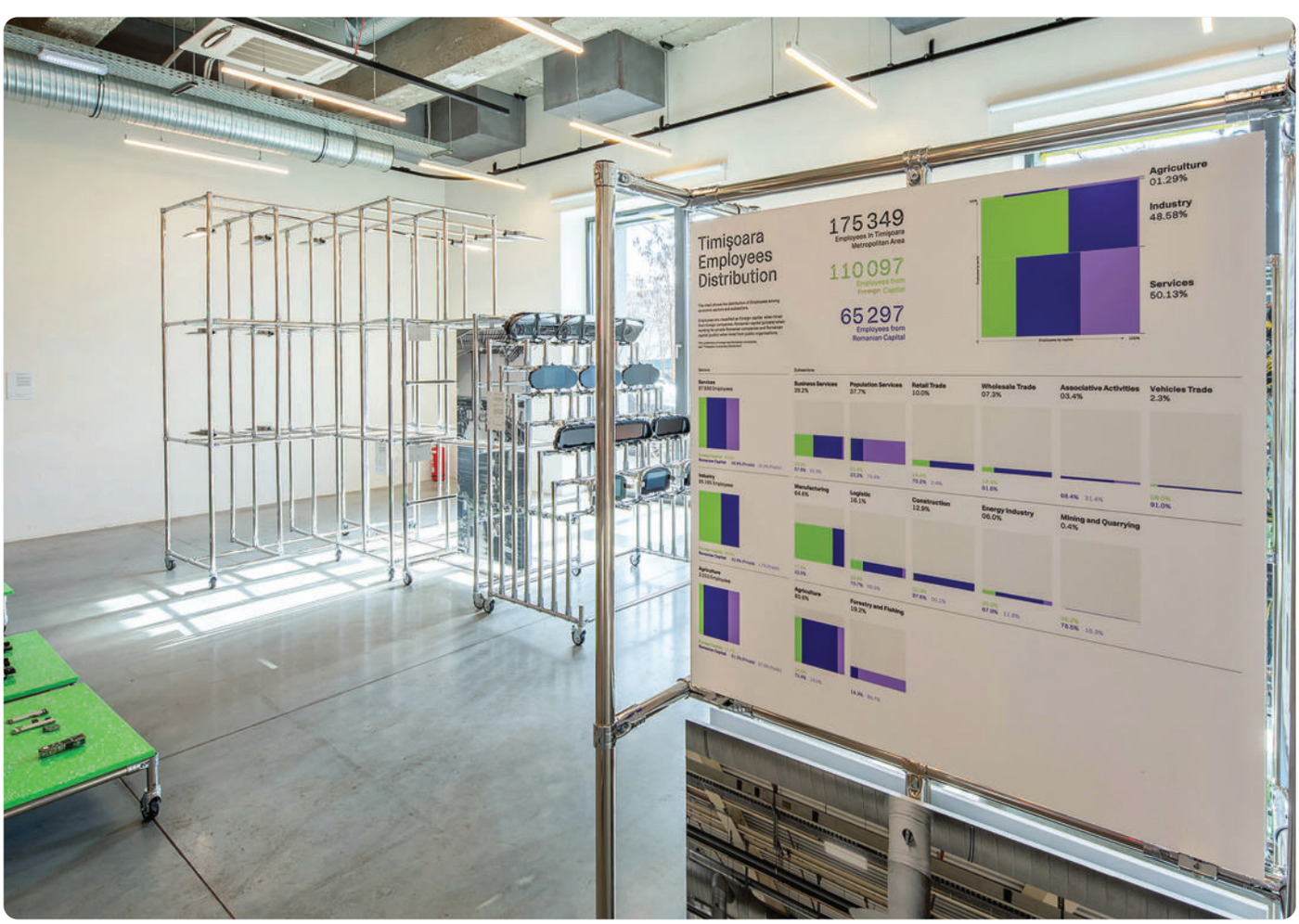
Dimensions: NOKIA board: 39×35 cm; ADVA board: 25×22 cm
Production year: 2022
Production rate: 20 hours
Production line workers: 15 operators

Client industry: communications, enterprise and cloud industry
Client name: NOKIA; ADVA
Throughout (part/year): NOKIA: 300 000/year; ADVA: 100 000/year
Export destination: Europe, America

IMPORT / EXPORT
Product section: XVI. Machinery/mechanical appliances; electrical equipment; parts; sound recorders/ reproducers tv image sound recorders/reproducers parts/ accessories
Industry: Manufacture of Computer, Electronic and Optical Products

Mirroring the Ecosystem —Infographics

INFOGRAPHICS 17.02.2023



Companies—Products Export Network

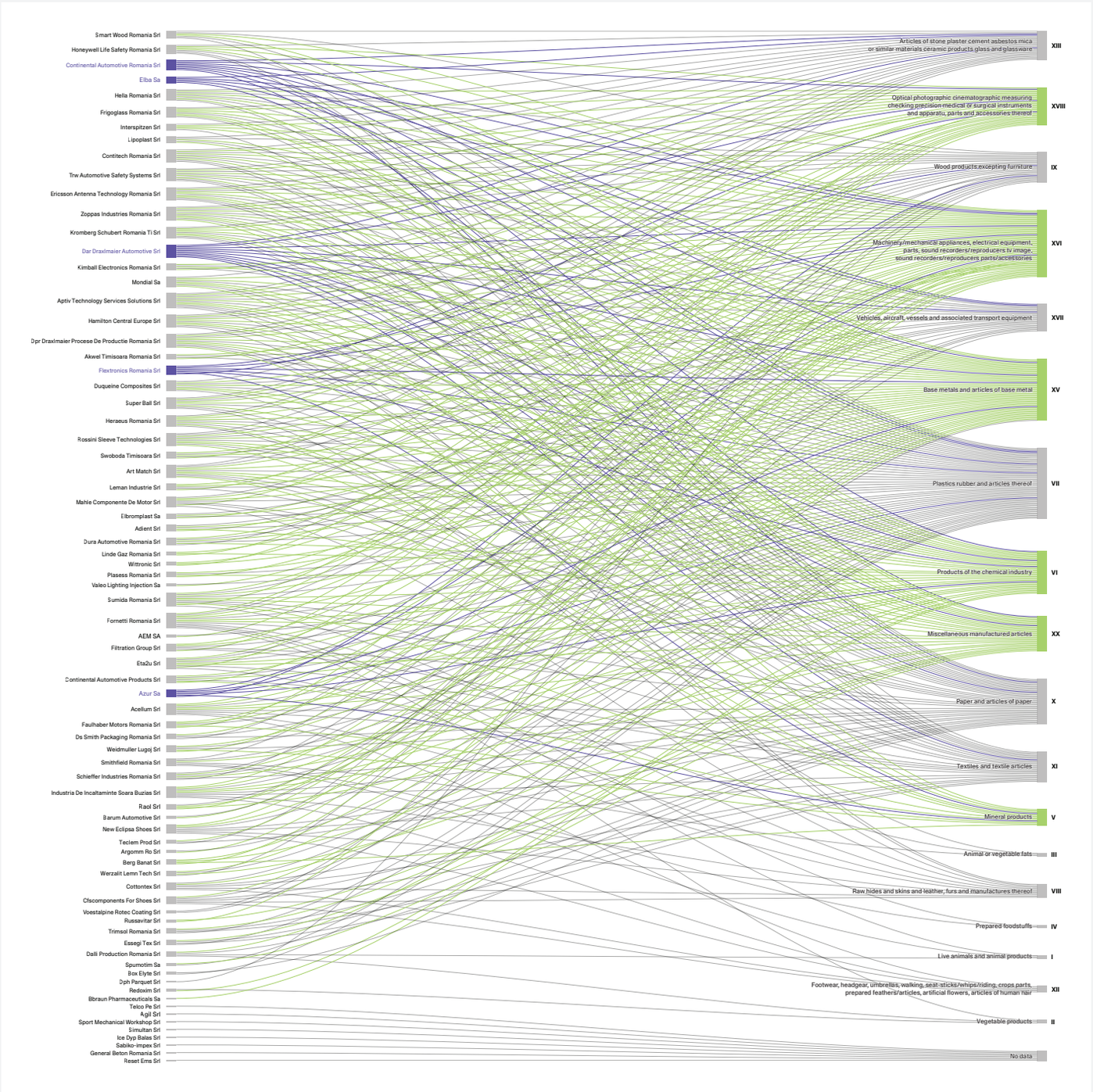
The network represents the connections between companies and the products they export. The companies depicted in the chart are the top 70 firms ranked by the number of employees, selected out of the 1 544 industrial manufacturing companies in Timiş county.

Products are clustered in sections according to the Harmonised System (HS) nomenclature, a classification system for commodities in international trade. It consists of over 5 000 commodity groups structured into 21 Sections (from I to XXI) and 97 chapters.

Purple identifies firms whose products are presented in the show, while green identifies the sections to which the exposed products belong. 'No Data' signifies that the company is not involved in either importing or exporting activities.

Data sources: CCIR: Camera de Comerț și Industrie a României, aggregated by termene.ro

Information design: Federico Santarini
Data research: Norbert Petrovici, Vlad Alexe



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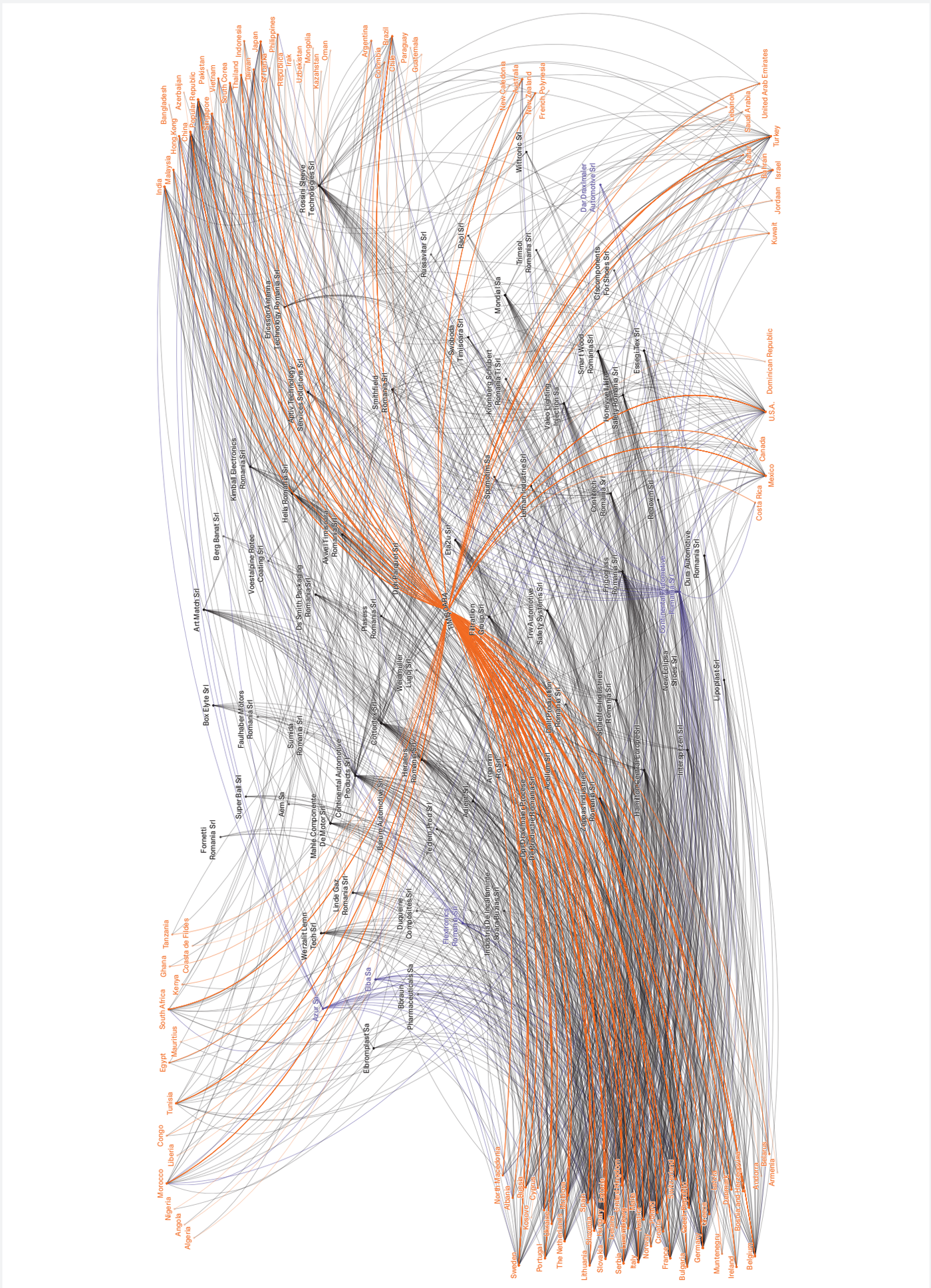
Companies—Countries Export Network

The network represents the interconnections between companies and their export destinations. The companies depicted in the chart are the top 70 firms ranked by the number of employees, selected out of the 1 544 industrial manufacturing companies in Timiş county.

Orange lines symbolise geographical connections originating from Timişoara and directed toward export countries, while black lines connect a company to its export destinations. Firms whose products are presented in the show are highlighted with purple lines.

Data sources: CCIR: Camera de Comerț și Industrie a României, Autoritatea Vamală română, aggregated by termene.ro

Information design: Federico Santarini
Data research: Norbert Petrovici, Vlad Alexe



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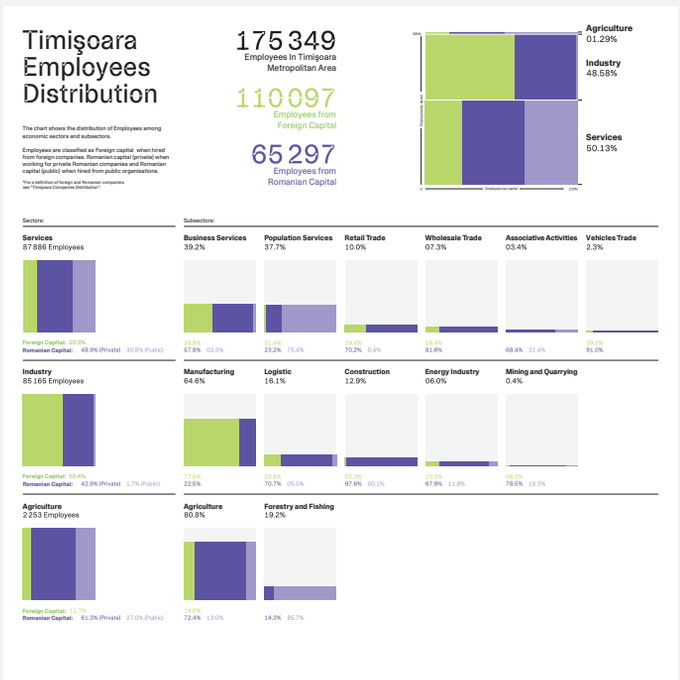
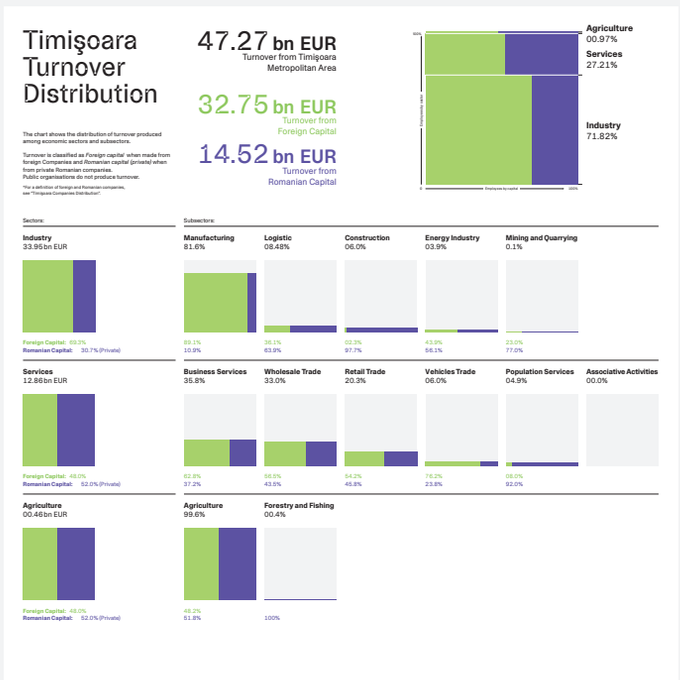
Timişoara's Economic Portrait

This series of three charts give a broad economic overview of the Timişoara metropolitan area. They show the number of companies, their distribution among Timişoara's metropolitan areas and how the employees and the turnover connected to those companies are spreaded among economic sectors and subsectors.





Data sources: ITM Timisoara, Oficiul Naţional al Registrului Comerţului (ONRC) aggregated by listafirmelor.ro

Information design: Federico Santarini
Data research: Norbert Petrovici, Vlad Alexe

Timişoara Companies Distribution

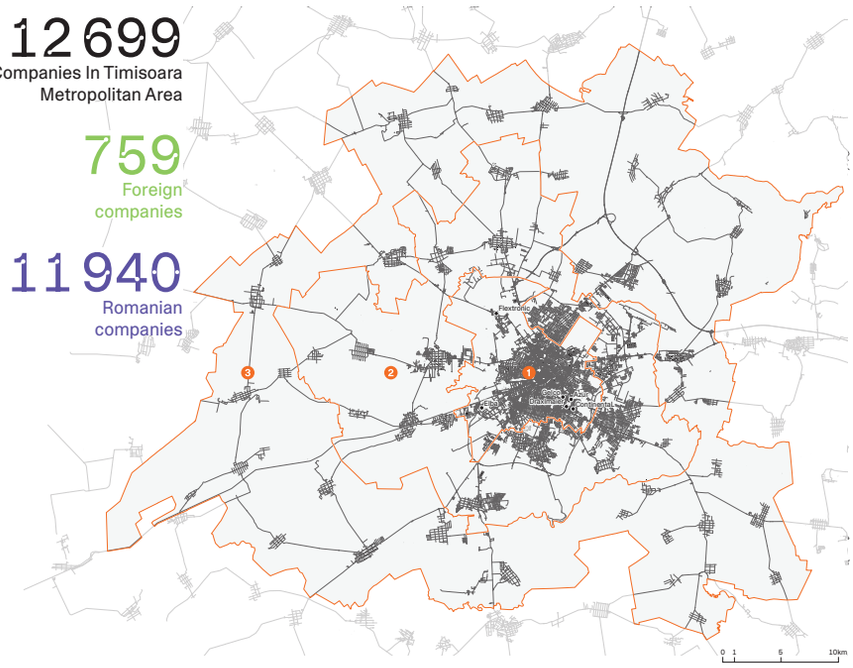
The chart shows the distribution of companies among the three metropolitan areas of Timişoara.

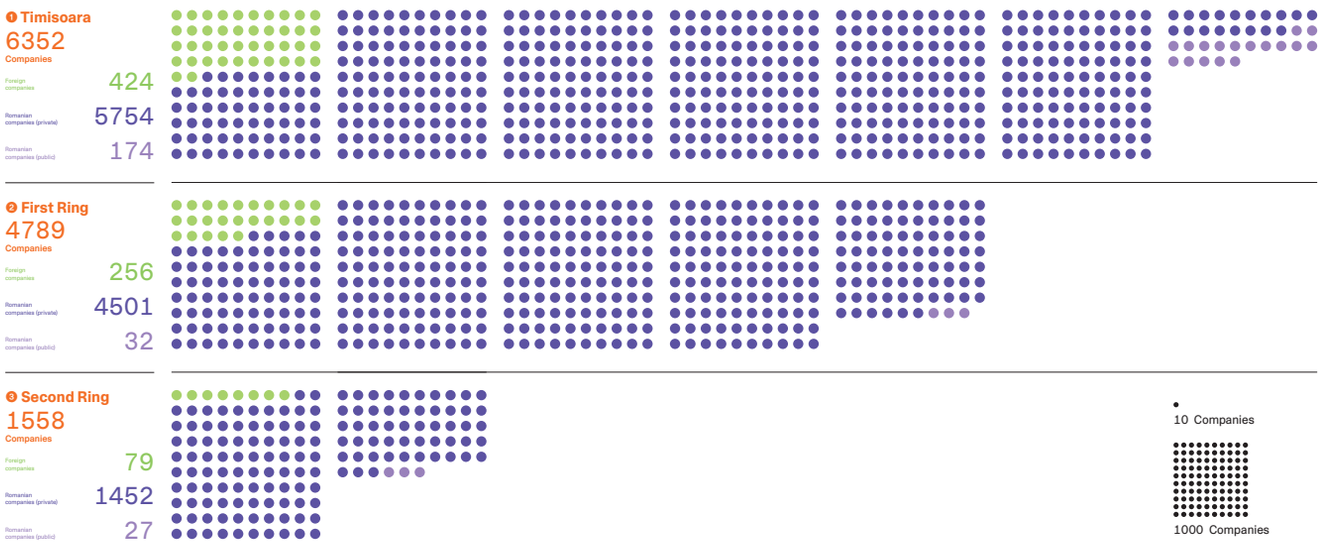
Companies are classified as "*Foreign*" when more than 50% of shares are from foreign investors, *Romanian (private)* when the majority of stakes are from Romanian investors and *Romanian (public)* for public organisations..

12 699
Companies In Timisoara Metropolitan Area

759
Foreign companies

11 940
Romanian companies





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3. Collaborations —designers working with academics

Autonomous Autos: How Human and Car Entangle

INTERVIEW 21.09.2023 TEXT BY CONNOR COOK

Our relationship with cars is parsed through cultural associations and sensorial experiences. As technology for self-driving automobiles advances steadily, so too will the relationship between humans and cars evolve: the sensors that enable an automobile to navigate a physical environment can also interface with the human passengers inside. 'Synthia', a creation by Flora Lechner and Cristina-Sorina Stângaciu, is an interactive installation that considers the human-like qualities of these automobile sensors and the kind of relationship they might inspire between humans and our vehicles.

Based in the Netherlands, Lechner is an interdisciplinary practitioner who blends art, design, and performance to explore the power dynamics at play between bodies, objects, and spaces. Cristina-Sorina Stângaciu is a lecturer and research engineer at the Computer and Information Technology Department of Politehnica University of Timișoara. Her areas of expertise span embedded and real-time hardware-software systems, the Internet of Things, and power management in embedded devices.

In this interview, they discuss the boundaries and potential of the technology currently being developed in the realm of autonomous vehicles and embedded systems, give insight into the evolution of their project, and reflect on the impact of their collaboration.

Your project 'Synthia' blurs the boundaries between humans and cars. How did you arrive at this theme?

Flora Lechner We were both interested, in different ways, in the relation between body and machine. I stumbled on a very weird article that used car maintenance as a metaphor for human fitness. It showed how to treat your body by explaining how to treat your car, because apparently some people better understand how to treat a car than a human body. It was ridiculous, but very inspiring. This started a thought process of switching around the car and the body. Digging deeper, I found these old-fashioned drawings from Fritz Kahn, which visualise the human body as machinery in a production industry. The sensory experience of riding in a car does link the body and machine—when a car suddenly stops or accelerates, you feel it in your stomach. It becomes difficult to understand where the body stops and the car begins. This sensory experience of the machine brought us to consider the sensory dimensions of Cristina's work with embedded systems.

What are embedded systems?

Cristina-Sorina Stângaciu Embedded systems are microprocessor-based hardware-software systems designed to perform particular tasks in the world. They enable autonomous vehicles, for example, to sense and react to their environment. These systems gather data from the environment like we do through sensors, and then use actuators to alter their environment, much like we use our bodies. In autonomous vehicles, certain human senses are replicated: sight with cameras, touch with pressure sensors, and hearing with microphones. Other sensory mechanisms—such as radar, ultrasound, and infrared—have no human analogue.

The car has often been compared to the human body, and vice versa. But as cars get smarter, the mind emerges as a new layer in the human-car metaphor. Your project makes this explicit through the creation of the 'Synthia' persona. What led you in this direction?

FL With self-driving cars, there is a lot of anxiety surrounding the loss of control. By deliberately anthropomorphising the car and endowing it with a human-like personality, we were curious if this would calm some of these anxieties. We are very interested in the question of who is controlling who in this relationship.

Anthropomorphizing could be viewed as dishonest because it masks the technical complexity of the system. How would you respond to this?

FL I don't personally see anthropomorphism as a bad thing. Many belief systems grant human-like qualities to objects, but these are often devalued by Western rationalist culture. I don't find it so bad to anthropomorphize an object in order to make it more familiar. I sometimes speak with my objects and thank them that they are still functioning. I think that there's a form of anthropomorphism that doesn't attempt to rank things in relation to the human, but rather to better facilitate communication and understanding.

Autonomous vehicle networks are notoriously complex and difficult to understand. Given the extent that these vehicles are entangled within broader systems of sensing and information processing, how much 'autonomy' do autonomous vehicles really have?

FL Autonomous vehicles are much more entangled with their environment than traditional vehicles. In some cases, the cars can be easily tricked into stopping by simply placing a traffic cone on the street (activists have exploited this behaviour to boycott self-driving cars). This shows that the cars are the opposite of autonomous with respect to their environment and the technical networks they operate within. In another sense, autonomous vehicles free the driver from the responsibility of driving, turning the car into a place for socialising or leisure. But is the driver really free from responsibility? If the car has an accident, who is responsible? The driver, or the person that programmed that car?

CS I think it helps to think about different levels of autonomy. There is no clear binary between a fully self-driving car and a fully manual car. Even before automated systems, protocols such as speed limits, laws, and road signs all restrict the driver's freedom. In modern vehicles, there are different levels of automation: automatic braking systems, lane assist systems, or cruise control systems. And the number of automated functionalities is increasing. The question becomes: what is the threshold beyond which the car becomes autonomous? At what point on this spectrum do people begin to feel uncomfortable? I think the thing that makes people uncomfortable is the decisions made by an automated system. That is where we feel our liberty can be compromised.

To follow, I wonder what is the threshold beyond which a simple trigger response is considered a 'decision'? It seems that this threshold might relate to processes of reasoning.

CS There are lots of debates surrounding situations when the vehicle needs to choose which person to save in an accident, for example. Does the algorithm save the passengers, the pedestrian, or the driver? There are differences in the way humans and algorithms react in this aspect.

Flora, your work usually involves the creation of handmade and one-of-a-kind pieces. This is the opposite of the industrial methodologies pioneered in the automobile industry. Did you modify your process in response to the themes and demands of the project?

FL In my projects I usually do every step by myself, but the scale of this project forced me to get out of that loop and to outsource. This was super interesting, and brought me now to a whole new way of working.
My process loosely mirrored the actual process of car design. I started with sketches, then cardboard models, then digital 3D models. These models were used to create templates that were sent to a metal fabrication company to be cut. I then assembled the pieces by hand, using 900 screws. In a way, it was a back-and-forth between craft and industrial techniques. I used the computer, but just as a simple tool for drawing: an extension of my hand. I didn't exploit the formal possibilities of 3D modelling software, but just used it to scale up my 2D drawings and transfer files to the company to cut. In this way, I think I still stayed true to the idea of handcraft despite the more technical workflow.

Large-scale infrastructures like autonomous vehicle systems are often characterised as coherent and legible systems. But in reality, the messy and provisional nature of a collage seems like a more apt metaphor. How do you view the final outcome?

CS Seeing the work of the research department through different eyes made me notice things I was not aware of before. Seeing through the eyes of the artist or visitor shows that our work, by itself, can be beautiful. I was particularly surprised by the impact that our installation had on children. In the special programmes that invited students to the exhibition, the children interacted very well with our installation. It is important for us to evaluate our work not only in objective terms: the number of citations, the impact factor of an article, and so on. And in this experience, we have seen the beauty of our work, not only the numerical part.

FL I see the work as a type of collage, because it reflects both on our collaboration, and the diverse streams of knowledge involved. It's a big puzzle piece with so many different layers, a storage space for all the different interactive elements and sensors that Cristina and her team put together. Some of these sensors existed before, and others were made for the project. The final output also serves as a memorial, inspired by pop-cultural representations of the car throughout history, but also reflecting on the future.

Romania: A Turntable, not a Trash Heap

INTERVIEW 14.09.2023 TEXT BY CONNOR COOK

The Romanian press has decried the nation's reputation as a European dumping ground for legal and illegal waste, often involving corruption and political ties. Nonetheless, the actual impact of this waste within the country has largely remained unexplored. The research project 'Waste Streams—Tracing Romania's Tangled Trash' sought to delve into the intricacies of Romania's waste management system, and how it relates to Europe's waste production and management system.

The project is the result of a collaboration between designer Cinzia Bongino and computer scientist Versavia Ancuța, who were matched through the Bright Cityscapes open call. Based in Italy, Bongino is a versatile graphic, information, and web designer, with a specialisation in UX/UI design and data visualisation. Ancuța is a computer science lecturer at the Politehnica University of Timișoara. Her specialisation lies in the domains of reliability, complex systems, and interdisciplinary data mining applications.

In this interview Bongino and Ancuța discuss the unexpected insights that emerged from bringing together their design and computer science research disciplines.

The project was a response to the pervasive media characterisation of Romania as 'Europe's landfill'. What were the project's findings regarding this characterisation?

Versavia Ancuța To answer that question, we need to discuss the data. Upon plotting the waste data according to clusterisation and volume, we discovered that Romania was in the middle of all European countries. This group of countries, which we informally termed the 'turntable group', handles the most waste transfers both in Europe and worldwide. However, the data on GDP shows Romania diverging from that middle group economically and aligning more with countries like France, Spain, Portugal, and Poland. This is noteworthy because, economically, Romania is what some might call a 'new tiger of Europe'. Data from 2020 and 2021 indicates that Romania is advancing on the global stage. So, we're not really a landfill but rather a turntable. We're in the centre. However, the media often prefer sensational headlines, which results in a skewed perception.

These conclusions emerged from the visualisation of data. We represented data sourced from Eurostat using a series of network graphs. By altering the graph's parameters, one can represent the data in various ways. A geographical view, for instance, is based on countries' actual locations, with flows between them depicted as lines. The money flow visualisation, on the other hand, uses a force-directed graph, arranged by connection quantity rather than geographical location. If one country exports waste to three others, which then export to three more, they're grouped together, forming a cluster. When discussing money, this viewpoint is more useful than a geographical viewpoint, since waste isn't always exported to the nearest countries but rather to where it's most economically advantageous.

Cinzia Bongino Research by the European Data Journalism Network reveals that in Romania, processing a ton of waste costs 17 euros, while in other EU countries the cost can easily exceed 500 euros[1]. That's a major reason why so much waste is sent to Romania. Additionally, despite its representation in the media, Romania isn't the worst in Europe for waste management, and many efforts are underway to improve it, such as the shutdown of non-compliant landfills and the launch of numerous new recycling centres. Wealthier European nations are equally or even more responsible for the waste issues in Europe, but this isn't discussed as frequently. Waste should be a top priority for any country, but it is a challenging issue and not a popular topic politically.

Let's delve deeper into the topic of visual representation. The topic of waste suggests messiness and chaos, but your project employs a precise, scientific, and technical visual language. The aesthetic decisions are interesting, because they indicate that waste networks are not necessarily messy and chaotic, but actually the result of quite precise protocols and economic policies. It points attention to the fact that this is also a system that has been designed to result in particular forms of dispossession and transfers of responsibility. Could you elaborate on the aesthetic choices for the project?

CB We started with the idea of bringing actual waste into the exhibition, but eventually decided that we were more interested in talking about the infrastructural system of waste management than the waste material itself. We chose the waste sorting facility as a space to host the research, because it evokes the infrastructural processes of transport and treatment. One conveyor belt is a visual representation of Europe's waste production, export strategies, and associated directives, while the other belt focuses on Romania's waste infrastructure,

and its environmental impacts. Additionally, four screens consider the topic from different scales, techniques of control, and territorial dimensions—from the scale of waste trade between EU countries and the disposal in Romanian landfills, to garbage image detection, and CCTV cameras monitoring people who don't sort their waste correctly. The endless rotation of the conveyor belts and videos on the screens represents the waste life-cycle. Always thought of as the end-life of a product, waste is itself a commodity traded in the global market. The correct treatment of it is essential for our planet's well-being.

It appears that each of you engaged in both the aesthetic decisions and data analysis for the project. How did you negotiate knowledge gaps in the collaboration?

CB It was a very smooth collaboration for me, because I also have this inclination towards researching and visualising with data. Versavia could access reliable information much faster than I could, given her native Romanian and knowledge of credible sources.

VA Yes, the whole collaboration was helped a lot by the fact that both Cinzia and I are highly analytical, so that was our common ground. I think that's reflected in the installation. It's analytical: we present the data devoid of emotion, in a way. And, honestly, when I started this project—please don't laugh too much—I was thinking we're going to make a big poster. And that's it. It was going to be a printed poster, and it would mean something. We far exceeded those expectations. This unanticipated outcome has helped me personally a lot, because it shows that design research is not just about the particulars of the data, but also the entire system and its presentation. Aesthetics are not just a visual problem, but a knowledge problem as well. This was new to me.

Can you expand on this relationship between representation and insight? In scientific discourse, are these visualisation techniques used as tools for knowledge production itself, or is visualisation merely a representation done after the fact?

VA It depends on who you're talking to. If you talk to computer scientists, we are probably going to be perfectly happy with just raw data in a spreadsheet. But in interdisciplinary research, where bridging knowledge gaps is vital, visualisation techniques are very important. When I collaborate with a doctor, for example, each of us must access the specialised knowledge of the other. When presented visually, we are each able to say "This makes sense because..." Based on that, further research can be conducted and data adjusted.

CB There are many schools of thought regarding data visualisation. I always prioritise the right chart for the right type of data, and decoration remains secondary. I don't mean that you just make a basic chart; I also apply my knowledge as a graphic designer to make it as clear and appealing as possible. At other times, a photo or video might be more information-rich than a conventional data visualisation. In the installation, there is a time-lapse showing the expansion of the landfills at the waste depot. This could have been represented through charts or maps, but in this case displaying a sequence of images made the evolution over time much more impactful.

The discipline of complex systems science has developed in tandem with developments in computation. How do you make sense of this entanglement of computation and knowledge production in the field?

VA It's obvious that we use computation to advance knowledge, and then that knowledge is used to create new computational model through advanced computation. But I think the ethical and social problems that appear alongside these technical developments are often overlooked. One of these problems is bias: the inherent bias that each of us has whether we want to or not. That bias shapes any computational model or representation we create. ChatGPT, for example, has a bias towards negativity; I think it was measured around 6%. If you play enough with it, you can make it very negative. So that's the problem with computation and knowledge production: you amplify the bias. When do you stop? And who oversees these restrictions? Who checks on the overseer?

Speaking of biases, something you mentioned regarding the research was striking. You claimed that legacy communist attitudes towards waste, such as 'we do not throw away' or 'everything can be reused' are actually hindrances to sustainability. Whereas it would seem that these quotes embody exactly the attitude to counter the wasteful disposable attitudes associated with capitalism and consumer culture. Why is this mentality problematic?

VA Taking my mother as an example, she has many unused radios in her home. One is an antique from my great grandfather, but she also has around five others, all of which are broken. But she does not throw any of them away. These contain very old components, with a lot of rare materials in them. Keeping them is not a good option if you don't use them, and you're never going to fix them. These kinds of attitudes, which stem from past hardships, make it difficult for proper recycling and waste management to take place. While on the surface, it seems sustainable—because you're not 'wasting' anything—in reality, it's preventing efficient and sustainable practices. Why keep them and not recycle them, to create something new? And that's not just my mother—I love her—but it's everybody.

These practices might be seen as a distributed temporary landfill, where waste management (or lack thereof) is less a techno-managerial, top-down directive, and more an everyday practice. It would seem then that, although a lot of the project touches on the idea of flows, it is also important to consider when and how those flows stop. To conclude: how did this collaboration make you reflect on your own domain?

CB The main insight for the project came from the analysis Versavia performed on the network, which

used mathematical methods to prove that there was missing data in the Eurostat dataset. And for me, this was fascinating. I always enjoy working with experts more advanced than me in a topic. This gives the opportunity to not only ask questions, but tap into professional knowledge that would otherwise cost me hours of research. I value this a lot because this kind of collaboration can push both parties involved in the process.

VA For me, honestly, it was super-fun. I thought it was going to be easy, I mean, it's art (*laughs*). What is so complicated about art? I turned out to be quite wrong. It was super-fun to see how other people are thinking. Mainly Cinzia, but not only her—all the other fellow designers, they think totally differently. It's so strange, like a puzzle. But it's a cool puzzle to unlock.

1 Mihaela Iordache. 'Romania: 25,000 deaths from pollution per year.' European Data Journalism Network, 16 December 2021. https://www.europeandatajournalism.eu/cp_data_news/romania-25-000-deaths-from-pollution-per-year/

Stress and Balance: The Structural Forces of Design

INTERVIEW 07.09.2023 TEXT BY CONNOR COOK

Amid continuous industrial and economic expansion, Timișoara has become a city marked by perpetual construction. Ensuring structural stability is a delicate balance of latent construction forces between materials, engineering, and human labour—as encapsulated in the concept of 'structural design', described by Ioan Both. The result of a collaboration instigated through the Bright Cityscapes open call, Both's research into 'structural design' was artistically interpreted by Parasite 2.0 into the sculpture 'Composition of Stress and Balance N. 1'.

Both is a senior lecturer at the Steel Structures and Structural Mechanics Department of Politehnica University of Timișoara, where he specialises in experimental testing of metallic materials and structural elements, along with numerical simulations, using the finite element method. Based between London and Milan, Parasite 2.0 is a design and research agency founded by Stefano Colombo, Eugenio Cosentino, and Luca Marullo in 2010. It explores the status of the human habitat through a blend of architecture, design, and scenography.

In this interview Eugenio Cosentino talks about the multidisciplinary collaboration with Ioan Both that resulted in expanding a structural engineering concept into a sculpture addressing themes of optimisation, economic growth, and knowledge gaps.

One aspect of the Bright Cityscapes programme sought to pair designers with industry experts. Given your architectural background, these collaborations are probably familiar. How was it different from industry collaborations you've had in the past?

Eugenio Cosentino (Parasite 2.0) As architects, we are used to working with structural engineers such as Ioan, but more as consultants than collaborators: we present a concept and ask the specialist the best way to physicalise it. This case was quite different, as the process worked in reverse. The project started with his research, and then we worked to translate this into something physical. It was a real collaboration, starting from the engineering and then moving towards the design.

Could you summarise the starting point you took from Ioan Both's research?

EC Simply put, he tests the structural performance of potential materials for architectural projects. Initially, he showed us some videos of a stress test of a miniature steel cylinder representing the steel inside concrete beams. This machine tests the strength of the material by stretching it until it breaks, determining how strong the final material should be. Other tests are virtual, using software programs to run simulations of structural performance using different materials and parameters, in order to understand how the structure responds to the strain applied to it. We found these tests fascinating, and they formed the initial spark of the project.

In collaborations with large knowledge gaps, it seems that visual language becomes a primary means of negotiating these gaps. Was that true for this process?

EC Engineers can understand the behaviour of a structure with numbers alone. But of course, software can produce visual representations that indicate where interventions are needed. It's impressive how, through a very simple image, a non-expert can immediately understand how it works. When you see the results of a structural simulation, you understand perfectly that blue represents minimal stress and red represents maximal. We found the graphic visualisations of these tests both communicative and aesthetically interesting, so we used them as a visual language for the project. In the context of this collective exhibition, entailing many projects and deep themes, we wanted to provide an effective means of directly engaging with such a complex topic.

The aesthetics of simulation suggest a logic of optimisation. How do you view the theme of optimisation in your work?

EC I think it depends on what we mean by optimisation. The structural optimisation that Ioan's work is concerned with is not central to our practice. But I would say that integration of the simulation aesthetics in the project could be seen as a good design optimisation of a concept, insofar as it allows one to immediately understand the topic and provides an entry point for deeper engagement with the work. I would say that we are often concerned with an optimisation of this kind in our work. Another way of looking at it is in relation to the economic optimisation of the time we spend on our projects, and the financial constraints of the work. This is something we are constantly engaged with.

The idea of optimisation of the experience of the work is quite interesting. The clarity and boldness of the visual

language both work to catch one's attention. In that way, the work could be described as 'Instagrammable'. Although this term can be pejorative, indicating that a work lacks depth, it also speaks to the broader digital infrastructures through which contemporary design projects circulate. Given that the vast majority of people who will see this work will see it on Instagram, capturing attention in these contexts is paramount. Are you conscious of these dynamics when designing your work?

EC I think it's a very important aspect of the work of a designer today. I also think 'Instagrammable' can be a positive adjective, indicating that a project can narrate itself through images. This is even more important when the project you're presenting is not permanent. For 99% of our career, Parasite 2.0 has developed temporary projects, so pictures of a project are all that remain in the end. When developing a project, we think of both aspects: the first-person experience, and the way that experience can be framed and narrated through images. When you understand what pictures must be taken to communicate projects effectively, you also understand the most important parts of the project.

Bringing up the 'economic optimisation' of your work is interesting in relation to stress and balance. As a design studio of three people working in a cultural context with limited budgets, your practice is strongly shaped by limitations that often remain invisible. Is this project also an attempt to render visible these hidden structures?

EC Absolutely. The exhibition primarily focused on Timișoara's growth over the past decades, considering the city's increasing demand for resources: material, economic, and labour. We went to Timișoara eight years ago for another project. In the years since, we noticed a huge and deep change in the city. This personal experience was very important for us in developing this project. Such growth requires time and labour, but tight deadlines often compress work into short periods. We wanted to explore the human aspect: the stress that the people working on the city's growth experience. 'Composition of Stress and Balance N. 1' was exactly about these two different but not-so-different worlds, playing with the double meaning of the engineering terms 'stress' and 'balance' as reflected in both Ioan's structural engineering research and the broader socioeconomic dynamics of the city.

This highlights the ways in which so much of a design project or any project is always already 'designed' from the start by broader structural forces that often don't really get addressed. What else did the project reveal to you?

EC The project revealed something to Ioan about his own work. He said: 'I always see my work as very boring. I like it because it is something that really interests me, but I don't find it very interesting for others.' However, the process of translating his usually digital technical work into a physical form with his own hands was a step towards reconsidering the broader appeal of his own work. He said that he wants to present this project to his students. In the university, these concepts are studied through technical diagrams. However, they could also be realised through spaghetti and sticks, through which one can understand something more concretely than through abstract pictures on the screen.

Soldering on: PCBs and the Economy of Errors

INTERVIEW 29.09.2023 TEXT BY CONNOR COOK

A Printed Circuit Board (PCB) is an essential component of almost every electronic device and system interacted with on a daily basis, and they have a significant industry presence in Timișoara. Although precision manufacturing and assembly of PCBs are essential for ensuring functionality, they are still manufactured through the error-prone methodology of soldering. For the project 'Error-driven Economy', Jing He has artistically reinterpreted Raul Ionel's research into the types of PCB errors and the economic impact of correcting them.

He is a visual artist from China, currently based in the Netherlands, with a keen interest in the cultural, political, and historical aspects of everyday objects. Ionel is an associate professor in the Measurements and Optical Electronics Department of the Faculty of Electronics, Telecommunications, and Information Technologies at the Politehnica University of Timișoara. His expertise lies in virtual instrumentation, LabVIEW, MATLAB, data acquisition, AOI, boundary scan, and functional testing.

In this interview, He and Ionel reflect on the development of their project, the contrasting artistic and scientific attitudes towards materials and techniques, and the social and cultural exchange they shared through collaborating.

In arts and design, errors are often seen as fundamental to the creative process. Raul, how does the error give shape to your work?

Raul Ionel In the world of testing, we always try to eliminate errors. But we are happy that we cannot do this completely, because it means we will always have work. As technology evolves, a pile of errors always accompanies this evolution. It's a continuous battle. But as the title of our project—'Error-driven Economy'—indicates, the error is what has led to the entire industry of testing, so in a way it also plays a creative role in my industry.

What are the main sources of error in Printed Circuit Board (PCB) soldering today?

RI There are two categories of error: systematic errors and random errors. Systematic errors have a known cause—for instance, faulty connections due to low-quality soldering material. Knowing the source of the error, you only have to think of how to mitigate it. Random errors, on the other hand, are unpredictable. They can be caused by operator error, for example, or due to defects in the machine caused by imperfect components. These errors often stem from economic considerations—for instance, 'we will use cheaper resistors because we want to earn extra money for the Christmas party this year'.

Jing He The tolerance of errors often depends on financial decisions. Some errors are identified but ignored, because they are not considered worth the investment required to fix them. There is a better solution, but it's not always worth investing in.

RI It all financially depends on what industry you are acting within. If you are producing vacuum cleaners, it's not a huge problem if a capacitor blows up; you can always replace it. But if the robot on Mars breaks, then it's not that easy to replace the components. So, the tolerance for errors is much lower.

To flip the title around, then it's not just the error-driven economy, but also economy-driven errors. Over the course of your career, has increasing automation led to the increase or decrease of errors?

RI I can only speak to some cases. The assembly of automotive clusters, for example, has been automated in some factories in the region. It seems that these companies are very satisfied with the automation process. The system does not make many mistakes when repeating the same assembly process over and over again. In this case, the errors have been reduced, but what if the automation is not very accurate? Then automation runs the risk of propagating an error throughout the entire system. So, I would not say that automation necessarily reduces errors, but I would say it can help.

Contrary to the demands of the economy the project is based on amplifying the error: the scaling up of common soldering errors in PCB manufacturing. Why did you pursue this strategy?

JH By scaling up, I wanted to give an emotional connection to the audience. We use PCB boards every day, but they remain cold and logical, far removed from daily experience. By enlarging some details, they begin to look random and organic, bringing the viewer emotionally closer to the details. Even though they represent mistakes, the forms are not random. The forms were derived from illustrations of common soldering mistakes I found in a booklet of industry standards. The mistakes are so common that they each have their own name.

How did you select the materials and techniques for crafting the objects?

JH I used only materials that are actually present on PCB boards, like plastic, ceramic, and metal. But of course, not the same type of ceramic and not the same type of plastic. I found it interesting that so many components are made of ceramic; it's really an industrial material. The production techniques were also derived from the real techniques used in PCB manufacturing, such as 3D printing. To shape the error forms in ceramic, I used my hands. I found it surprising that soldering is still used, although it is quite difficult to control. I wanted to capture this high-tech, low-tech combination in the technique, so I set up a playground for myself to shape the clay.

Raul, what was it like for you to see the details of your research amplified in this way?

RI I never expected the result; I was totally surprised. The objects that Jing created zoom into our microscopic world of PCB production. I would be very happy to have them, and to present them to our students, because they express exactly some ideas of what's really happening in the engineering world.

JH I didn't expect the work to become an educational tool (laughs).

Jing, your work often attends to the cultural context of objects. Do you see the technical protocols and standards in this project as forms of culture?

JH Well, like technical standards, culture is also constructed step-by-step, over time: it is not natural. You realise this when you change into another context, and then look back and can recognise what culture you come from. This was my experience growing up in China and moving to the Netherlands. Coming to the Netherlands helped me understand where I come from, and the soft rules and traditions that make up that context. Things that I thought were natural were actually made up by people at certain points in time.

How did the cultural context of Romania in particular give shape to this project?

RI I have been lucky enough to travel and work in different countries around the world. Returning to Romania, I have seen the country become more attractive in the past ten years for electronic manufacturing companies. Twenty years ago, Romania was not the greatest place to gain experience in electronics because there were too few points on the map where they produced something. Nowadays, Romania is gaining more and more ground in the field of electronics and software. Even so, Romania has great learning opportunities nowadays, and more and more young people are wanting to stay in the country for this reason. We even have people coming from other countries to work here. We did not launch a rocket to Mars, but we can produce for Mercedes, BMW or Porsche.

What factors have contributed to this shift?

RI I would say a mix of economic policies, institutions, and companies. Economically speaking, let's not ignore the fact that wages are lower than in other countries. We are still an affordable country. But in my experience, many companies have been surprised by Romanian people. Many younger Romanian people can speak English, which is not that common in the region. This, and the fact that Romanians are very open —nationalism in Romania is quite low—encourages companies to keep on trying to expand their business here. But I don't know how much longer this will work economically.

JH I had never been to Romania, but I was always curious about its communist history. Coming from China, I was interested in how a country with a similar political history has evolved in the years since the revolution. The history is very complicated and is not directly related to the project, but it's something I feel very excited about.

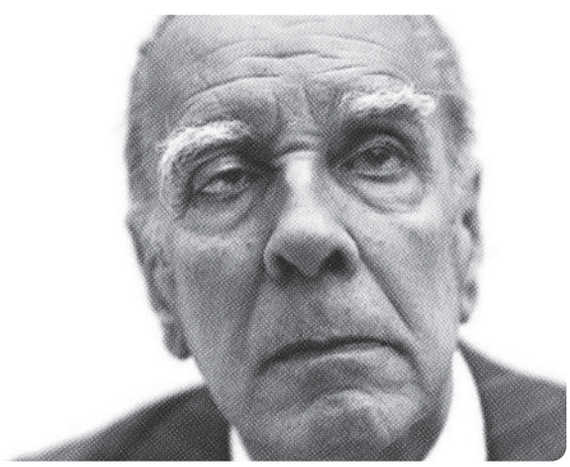
4. Constellations —designers orchestrating connections

Material Agency: Minerals make Timișoara

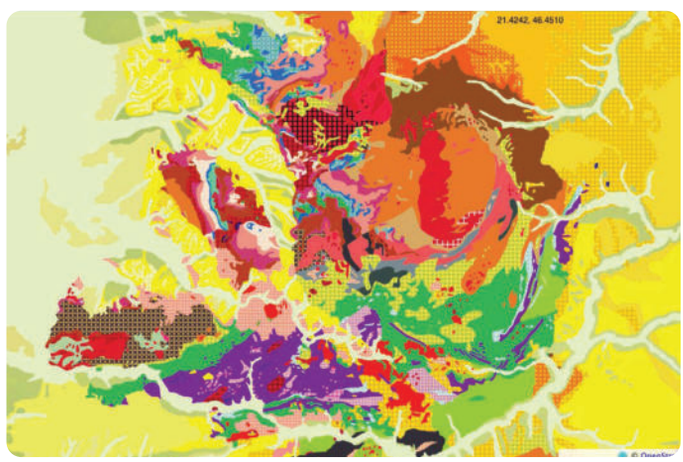
VISUAL ESSAY 31.08.2023 TEXT BY SANTIAGO REYES VILLAVECES

The notion that materials themselves may possess intentions and influences challenges the anthropocentric perspective, urging the contemplation of alternative outcomes and realities. Santiago Reyes Villaveces's installation 'Anonymous Materials', a part of the *Turn Signals—Design is not a Dashboard* exhibition, comprises an evocative collection of objects, mineral specimens, and geological data. It encourages pondering how Timișoara's industrial processes and everyday existence are moulded by its materials.

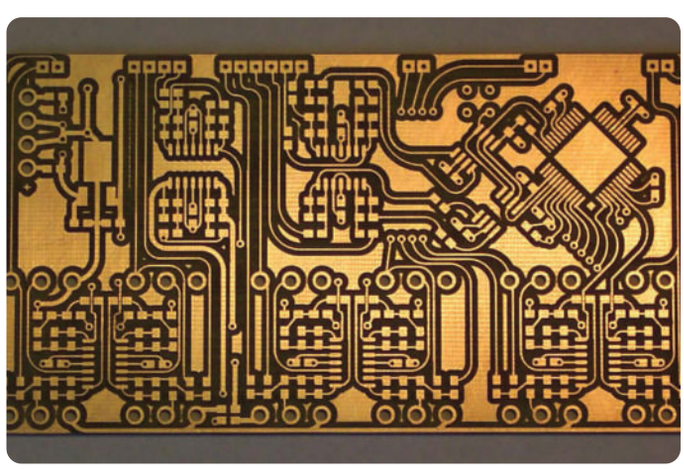
This project emerged from a collaboration with the Politehnica University of Timișoara, which houses a mineral collection. Specific rocks were meticulously chosen through discussions with Professor Jurca Marius, using data from the Geological Institute of Romania. During a three-week immersive artistic residency in Timișoara, Reyes Villaveces engaged in a multi-layered experience with the city, where symbolic, historical, and daily life objects informed the project. He shares his visual diary and observations, weaving a poetic narrative that traces the origins of the project.



(1) 'In that Empire, the Art of Cartography reached such Perfection that the Map of a single Province occupied an entire City, and the Map of the Empire, an entire Province. With Time, these Overly Detailed Maps no longer satisfied, and the Colleges of Cartographers raised a Map of the Empire, which had the Size of the Empire and exactly coincided with it. Less Addicted to the Study of Cartography, the Following Generations understood that this extended Map was Useless, and not without Impiety, they handed it over to the Inclemencies of the Sun and Winters. In the deserts of the West, there are Ruins of the Map, inhabited by Animals and Beggars; there is no other relic of the Geographic Disciplines throughout the Country.'—'On Exactitude in Science' by Jorge Luis Borges (1946), *Collected Fictions* (1999), translated by Andrew Hurley.



(2) One thing is the map of the territory, and another is the territory. It seems evident, but it isn't.



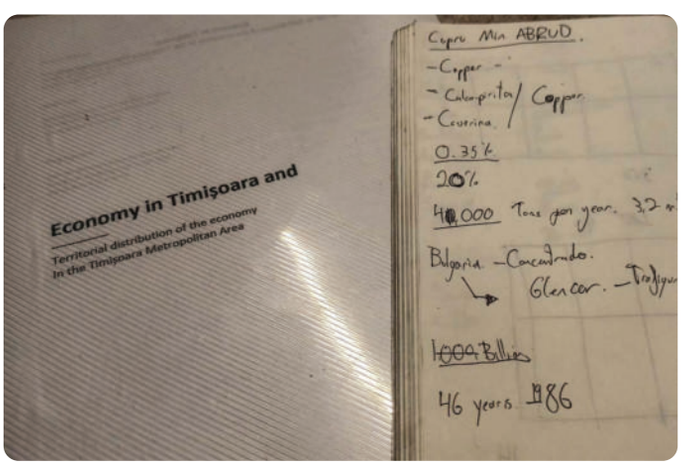
(3) There are many kinds of maps, and each serves a distinct purpose.

(4) I departed at 5am. I was looking at the Magdalena River from the door of my studio in Colombia.

(5) Before getting into the car, I had a last glimpse of the river. I stood next to a crying rubber tree that I had cut to extract a drop of rubber that I would carry to Timișoara.

(6) I departed from El Dorado Airport in Bogotá on July 24, 2023. I had recently received a Gold credit card from the bank, and I had accepted the bank's offer as the card allowed me to access the VIP area of the airport.

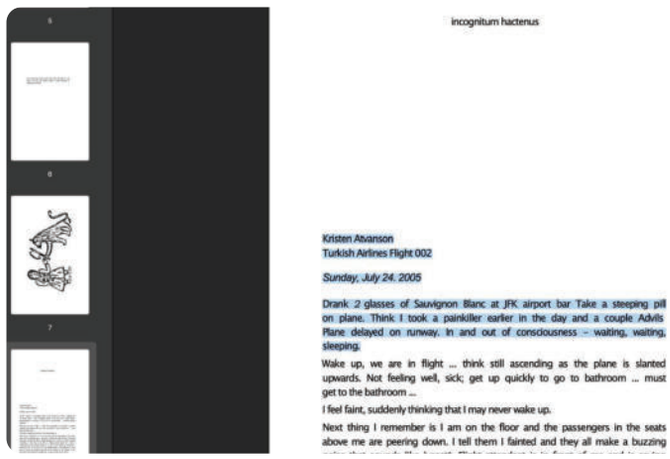
(7) The rooms of the VIP area are dedicated to pre-Colombian gold pieces as a simulacrum of the Gold Museum in Bogotá. The room is filled with replicas of the pre-Colombian pieces that were saved from the colonisers who melted the gold pieces to make coins. The pre-Colombian gold pieces were forms of storing information; thousands of years of knowledge were melted to fund the European industrial revolution and the colonial projects.



(8) I opened my laptop. The browser is populated with multiple tabs containing information on the mineral composition of the Timișoara region. I have been tracing the mineral deposits related to the supply chains of the region. In a printed copy of the 'Economy in Timișoara: Territorial Distribution of the Economy in the Timișoara Metropolitan Area' report, I have highlighted all relevant information about mineral and extractive industries.

(9) The first tab is the website of the Brad Gold Museum. There are two gold museums in the same place. I'm nervous. A 30-hour trip awaits. The VIP area has an open bar. I take a double whisky on the rocks.

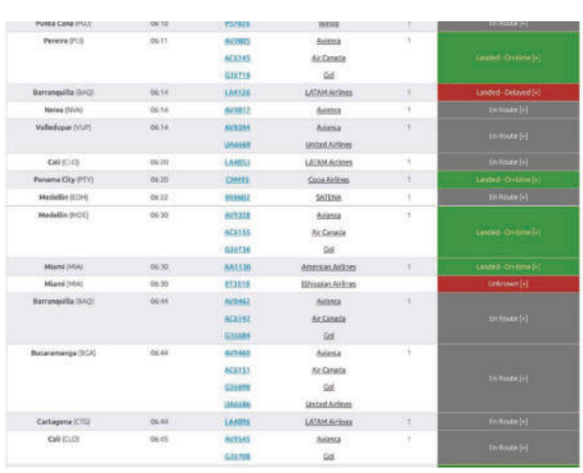
(10) I look at the departure screen, and I still have more than two hours. I decide to reread *Cyclonopedia: Complicity with Anonymous Materials* (2008) by Reza Negarestani. I have been reading it for the Timișoara project. I have borrowed the title for my project. The project adopts the perspective of material agency, drawing inspiration from Negarestani's concept, which emphasises that materials possess their desires, intentions, and capacities for action. In *Cyclonopedia*, which examines materiality through a unique fusion of philosophy, fiction, and horror, oil is depicted as an active and sentient force with profound influences on human history, politics, and culture. This notion challenges the traditional view of materials as passive objects and encourages exploration of the complex interactions between human and non-human entities. Material agency posits that materials possess desires, intentions, and capacities for action.



(11) I began reading the first page of *Cyclonopedia: Complicity with Anonymous Materials*:

> "Kristen Atvanson
> Turkish Airlines Flight 002
>
> Sunday July 24, 2005
>
> Drank 2 glasses of Sauvignon Blanc at JFK airport bar. Took a sleeping pill on the plane. I think I took a painkiller earlier in the day and a couple of Advils. The plane was delayed on the runway. In and out of consciousness—waiting, waiting, sleeping."

Negarestani (2008), *Cyclonopedia*, page 1

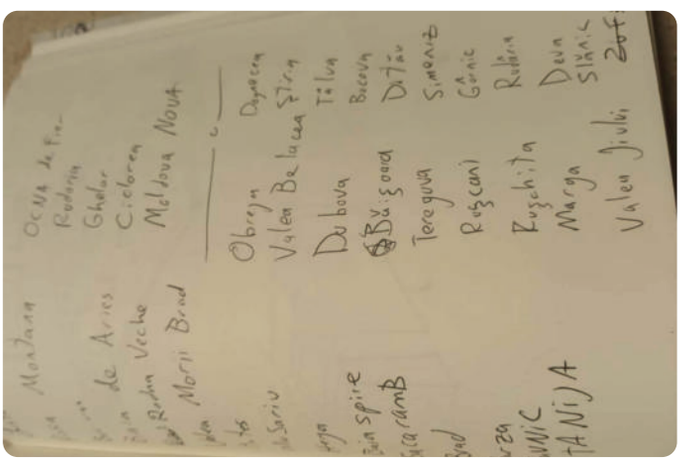


(12) As I saw the date I looked back at the departure screen. It is July 24, 2023, 18 years on the exact same day I'm about to board a plane. On the table are my Gold credit card and my boarding pass from El Dorado to Timișoara, next to the replicas of pre-Colombian gold pieces. Everything is clear.

(13) I must go to the Gold Museum in Brad.

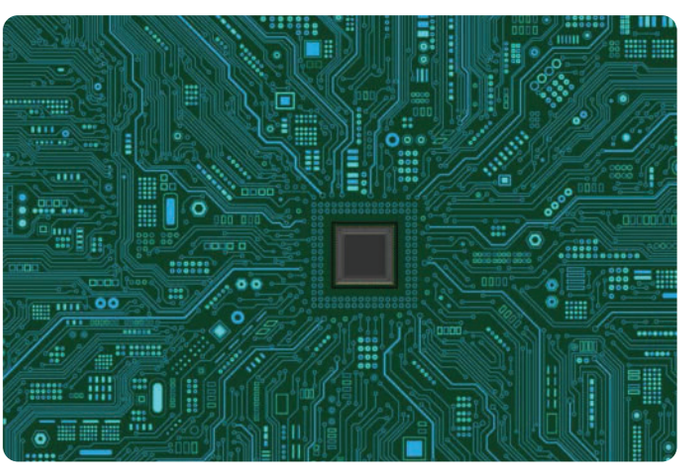
(16) The room is a map made out of rocks. But it is not the territory. However, the territory is made out of these very same rocks.

(14) As soon as I arrived in Timișoara, I went to the Faculty of Industrial Chemistry and Environmental Engineering at the Politehnica University of Timișoara. The name of the building was written in artificial moss painted in red and green, resembling a living organism.



(17) My laptop is dead. The lithium of the battery is no longer able to power it. I write all the names of the places where the rocks were taken from in my notebook. I'm starting to realise that I'm forgetting how to handwrite. I can barely understand written words.

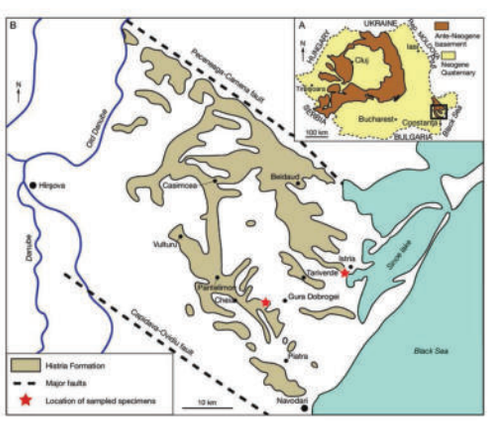
(15) Professor Jurca Marius, who was waiting for me, opens the door of the room. The classroom is filled with rocks on shelves and in showcases. Each rock is labelled with the name of the mineral and the site where it was extracted.



(18) I shouldn't have accepted the Gold credit card and its high fees; instead I should have bought a new laptop, I think.

(19) Prof. Jurca explains on the blackboard the chemical composition of the gypsum mineral, fundamental for the chemical industry's production of plasterboards.

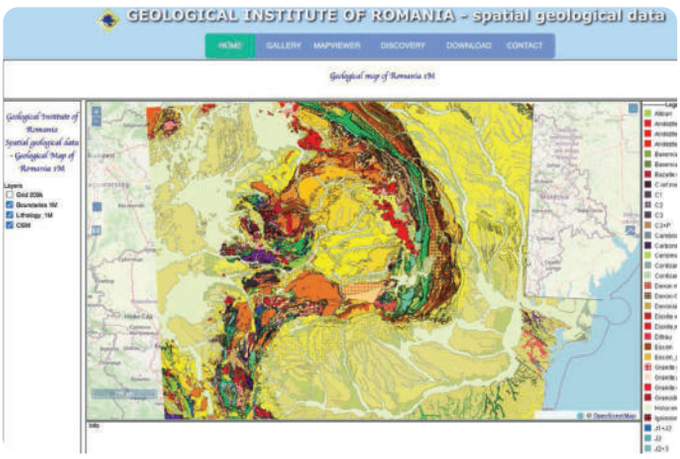
(20) He showed me an old magazine image of the Tethys Sea that occupied this territory 50 million years ago. "These minerals are the fossils of the sea, billions of seashells compacted by time make the gypsum."



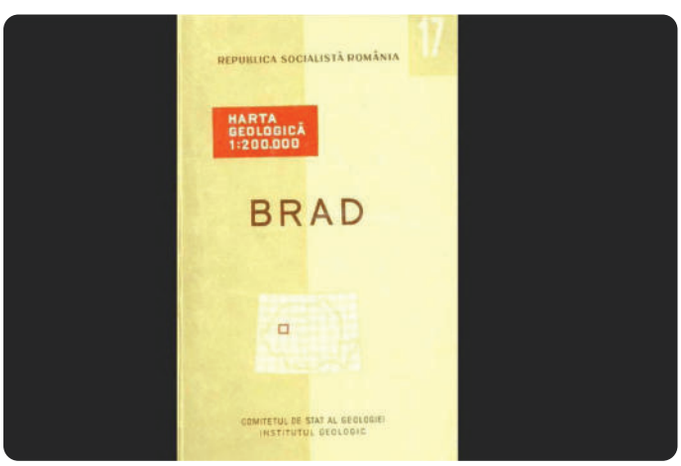
(21) I'm fascinated by the colours of this old magazine's map of the Tethys Sea.

(22) I'm hungry. I have jet lag, haven't slept properly, and the eating times are confusing. I go to the local market, and the colours of the vegetables and fruits make me think of the map. The green of the pickles is the product of the combination of human labour, water, sun, and surely traces of the fossilised Tethys Sea. The market is not a map of the territory, but it brings me closer to it.

(23) I take wooden boxes that were used to transport the fruits from the market, as a reminder of that cartographic scene.



(24) As part of my research residency in Timișoara, in Google Maps I craft a map of all the mineral deposits that I had written about in my notebook. I take care to correlate the precise coordinates of these deposits with the extensive cartographic database maintained by the Geological Institute of Romania. This endeavour grants me an understanding of the intricate composition of these geological samples that Prof. Jurca has shown me. The Geological Institute's map unfolds before me, a virtual tapestry of mineral layers, effectively serving as the definitive cartographic guide to the nation's composition. To map is to assume control.



(25) After waiting for some days in Timișoara, we received clearance to visit the main copper mine in Romania. In geological terms, the mine is located in the most complex area of the country, known as the quadrilateral of gold—a geological rarity of unique mineral deposits. It's in the same area as Brad and its museum of gold.

(26) On the way to Roșia Poieni Mine, we passed by multiple mines. We were following the same path that I had traced on Google Maps.

(27) Upon our arrival at the mine's entrance, an evocative tableau unfolded before my eyes—a simple table adorned with an assortment of rocks selected by miners. It's probable that in the middle of their daily activities, the shine of the pyrite caught their attention.

(28) This unique locale of reddish rocks full of copper held an unexpected revelation.

(29) The mine manager explained that the copper concentration here hovered at a mere 0.08%. Incredibly, despite this seemingly paltry figure, the mine churned out an astonishing 4,000 tons annually. At this concentration, the remaining 99.92% of the material proved unusable.

(32)

(30) The mine, in its relentless pursuit of copper, was reshaping the very contours of its own landscape — a territory yearning for its own map.

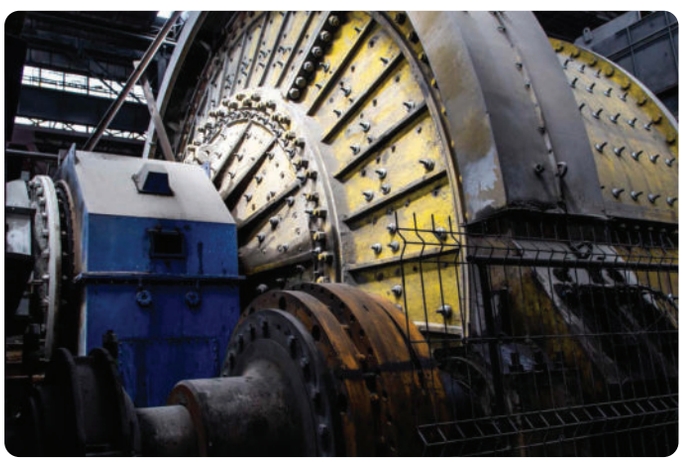
(33) The process of grinding and separating the copper concentrate expelled a toxic smell that stayed in my skin for days.

(31) The mining processing facility, an imposing structure resembling an apocalyptic futuristic spaceship, dwarfed human scale and significance.

(34) And the grey darkness of the plant contrasted with the colourful image of the geological map of the Geological Institute of Romania.

(35)

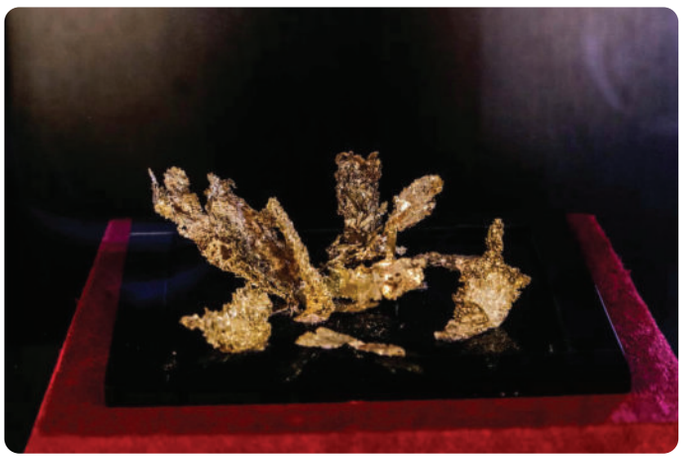

(38) Trucks the size of a building moved 200 tons of rock to obtain no more than 160 kilograms of copper.


(36)


(39)


(37) As we ventured further, I was confronted by a visceral sight—a colossal pit, a vast abyss where human activity unfolded on a scale that defied comprehension. It was as though I had inadvertently entered a theatre of horrors.


(40)



(41) After we left the mine, our journey eventually brought us to the Brad Gold Museum. Within the museum's hallowed halls, glass showcases gleamed with an abundance of gold, each precious nugget nestled among quartz in its natural form.

(42) The shapes and patterns of these pure gold specimens invoked memories of the pre-Columbian artistry I had encountered in the VIP area of El Dorado Airport.

(43) It was intriguing to observe that gold itself appeared to possess an innate inclination, selecting its own unique forms to bask in the radiance of the world's gaze.

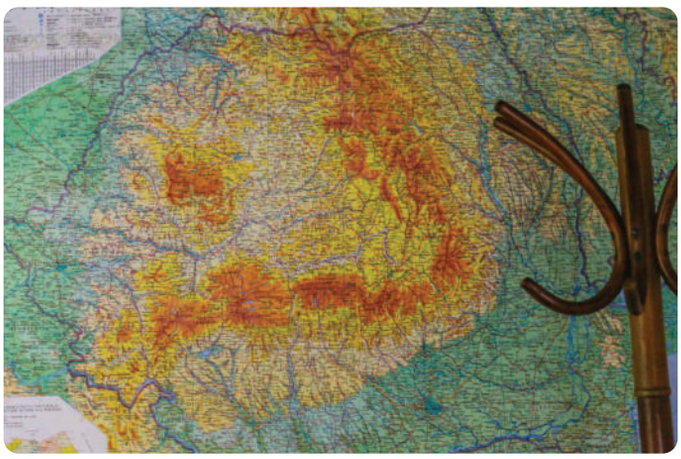
(44) A nearby family, seated within the museum's embrace, appeared delighted by the allure of gold and its intrinsic value. Their hushed conversations revolved exclusively around the wealth represented by these gleaming treasures. In their eyes, gold held a dual role, both as a symbol and the embodiment of value itself.

(45) A moment of pure excitement ensued as the youngest member of the family, an exuberant child, implored his mother's attention, pointing animatedly at a particularly shiny rock. 'Mama, look at all this gold! Let's take it,' he exclaimed in sheer delight. The father, captivated by the fervour of his eight-year-old son, eagerly joined in, their shared enthusiasm infectious. Yet, the mother, ever cautious, swiftly turned her attention to a nearby label that revealed the truth: 'Pyrite, also known as fool's gold.' The same that was on the table at the entrance of Roisa Poeini mine, it is full of copper.

(46) Returning to the hotel, my pockets weighed heavily with collected rocks, tangible souvenirs affirming my presence in this fascinating landscape, serving as the building blocks for my personal cartographic endeavours.

(47) In my final week of exploration, I embarked on a visit to the Village Museum in Timișoara.

(48) This remarkable place unfolded as a vivid simulacrum of Romanian territory, a mesmerising tapestry of times and architectures. Yet, within this meticulously recreated landscape, I couldn't help but ponder the absence of a Soviet-era apartment or a villa representing the Roma community.



(49) The Village Museum, while meticulously capturing the essence of houses, revealed a poignant truth—that a house, in its purest form, necessitates occupation. Without the heartbeat of life coursing through its walls, it remains a mere fiction, akin to the maps that seek to define the sprawling territories beyond.

Glimpsing the Cosmos in the Gaps of Optimisation

INTERVIEW 31.08.2023

Human comprehension of the physical processes and properties of the Earth relies heavily on technology-driven systems like satellite imagery and climate models. These technologies have become essential for monitoring the impact of human actions on the planet. However, there exists a disconnect between local experiences and the abstract, algorithm-based climate projections that are beyond human perception. The need to bridge this gap is probed by Guillemette Legrand's project 'From Here to the Cosmos: Incomputable Views of the Above, Under and Around'.

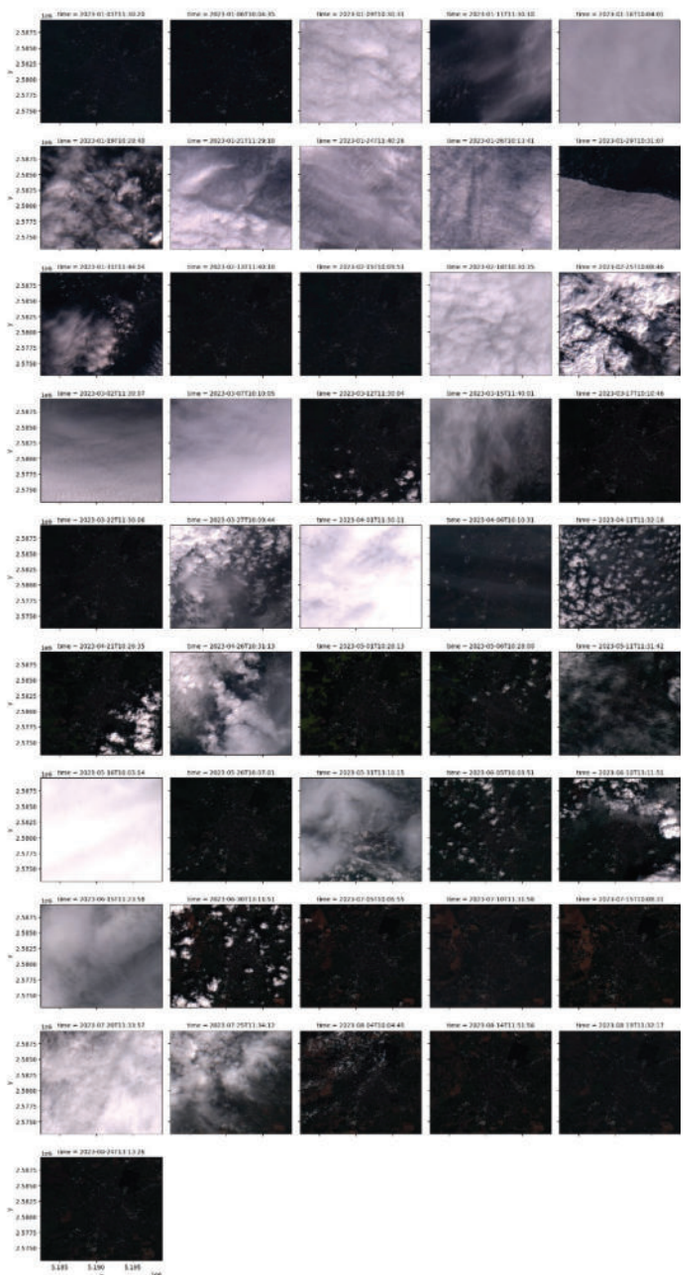
Legrand is an artist and designer who uses machine-fictioning to explore the (im)materiality of emerging information technologies and their capacity to form contexts that normalise specific belief systems. For this project, they worked together with Marian Neagul, who is currently a postdoctoral researcher at the Institute eAustria Timișoara and West University Timișoara. Neagul's general research topics cover machine learning, distributed systems, computer networks, operating systems, and Earth observation.

In this interview, Legrand discusses the concept and evolution of the project, what makes for valuable art-science collaborations, and the importance of recognising the ideologies and gaps in technological systems.

'From Here to the Cosmos: Incomputable Views of the Above, Under and Around' was one of the projects presented in the Turn Signals—Design is not a Dashboard *exhibition. How was the project experienced?*

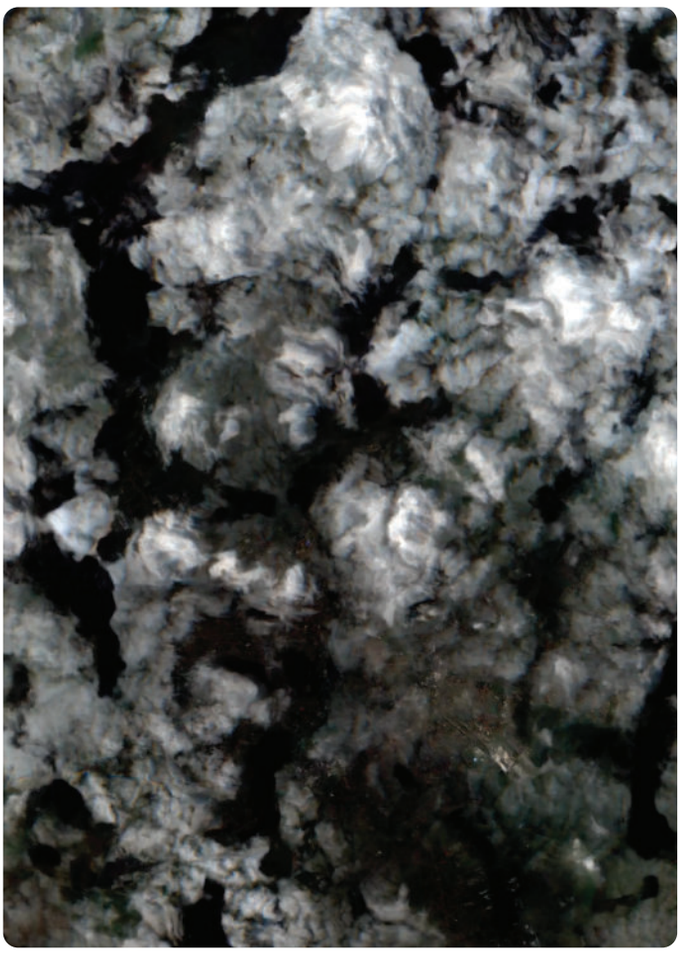
Guillemette Legrand Visitors to the exhibition experienced the project as a fragment of what may be the inside of a sphere mesh; an archetype of the Earth's shape. Standing in front of this fragment, visitors observed various algorithmic simulations of the geophysical condition of the Earth, produced by autonomous technical systems. These simulations were rendered at different timescales extracted from three environments of Timișoara: above (cloud detection), around (land usage detection), and under (ground motion monitoring). A voice-over renarrates the synthetic visuality and the computational logic behind what is seen, while longing for new forms of embodied and situated imaginations of the planet.

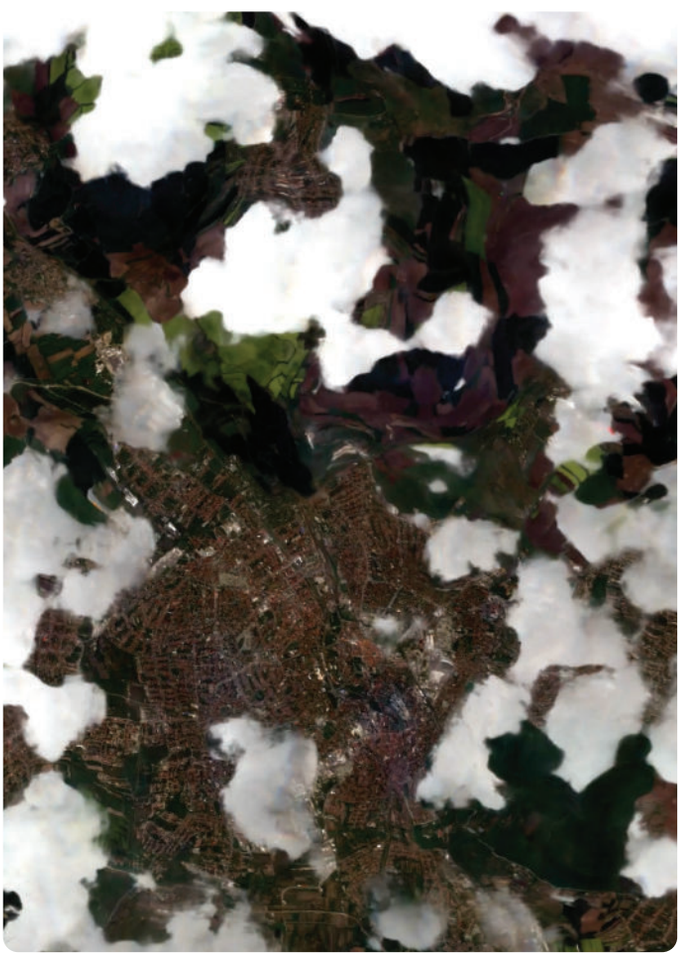
The project does indeed have an expansive ffect from the scale of personal observation to planetary complexity. What was the motivation behind the project?



Inventory of the extracted cloud data from Timișoara with time stamps

GL I began with the intention of merging my current research on the practices and discourses around Earth and climate imaging, with the socio-cultural and scientific context of the city of Timișoara. To bring these two aspects together, I was interested in understanding the specific practice of 'Earth-imaging' in the context of an Earth-observation laboratory that is working with visualisation practices in Timișoara and Romania as a whole.





Interpolated images extracted from the national earth observation data cube

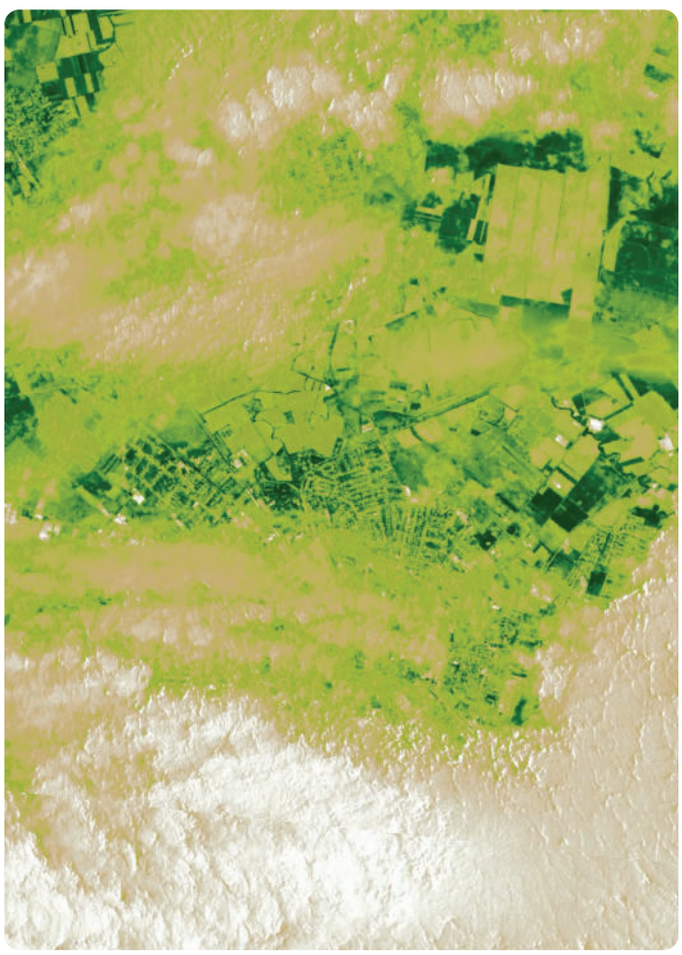
The project is an attempt to re-narrate the technical systems that mediate the relationship between human, machine and Earth, by collapsing different timescale and synthetic visions, while searching for other ways to enrich and diversify the machine gaze from a situated and embodied perspective. The final installation is an attempt to create a situation where the viewer faces the land above, around and under their feet through the mediation of the technological gaze; in order to both understand and see beyond this gaze.

Why is seeing beyond the technological gaze important?

GL The human understanding of the geophysical Earth is increasingly mediated by a complex infrastructure that senses and models the planet as a volumetric object, and that produces important knowledge determining the future of the planet. This technological mediation is the dominant gaze through which humans have been able to render visible the impact of human activity on the Earth and its climate. The visual culture emerging from this infrastructure operates at a more-than-human timescale; beyond human senses. This technical infrastructure has become the necessary proxy to maintain life on Earth, but this visuality has also created a gap between empiric and local experience, and the algorithmic vision anticipating climate collapse. The project emphasises that this visuality is insufficient knowledge, yet at the same time, this visuality also naturalises specific socio-cultural beliefs about our human relationship with the Earth. Consequently, our cosmological understanding of the world-to-come is shifting.

How did you come to collaborate with Marian Neagul and the other scientific partners involved in this project?

GL I first learned about Neagul's research online, and contacted him to establish an initial conversation about his current work in ML-aided Earth observation and visualisation practice around land usage in Timișoara and Romania. This initial conversation with Neagul led to a series of informal interviews with Romanian scientists working on tools used to sense and model different Earth environments. These conversations were instrumental in developing an understanding of specific technical developments in Romania relating to planetary-scale infrastructure, such as the Copernicus programme—the Earth observation component of the European Union's Space Programme. Apart from Neagul, there were two other key partners that I collaborated with: Terrasigna, who specialise in ground motion monitoring; and the Meteorological Office of Bucharest. Together, these three partners provided data and support in developing compelling visualisations to communicate Timișoara's specific geophysical conditions across various timescales. The choice of these partners was responding to the idea of building a planetary collage of different machine gazes—from the skies, the Earth's crust and the underground. The cooperation was developed with the idea of creating interfaces for these three layers of vision; from the cosmos to the underground, portraying different views of Timișoara.



Interpolated images extracted from Vegetation indices (NDVI) using the Sentinel-2 L1C data

How did you integrate this research into the project's design process?

GL In my work, I examine if and how machines and their operative systems fictionalise reality and naturalise specific perspectives that have the potential to push specific world-narratives or cosmologies. By appropriating the potential of algorithmic systems to fictionalise reality, I aim to create a different embodiment of this gaze, enabling different world-imaginations.

In parallel with the conversations with scientists, I used such a machine-fictioning practice to understand both the socio-cultural imagination created by the existing technical apparatus, and re-narrate other stories of planetary visions experienced through a situated and embodied knowledge. At an early stage of the project, the iteration of the designed environment for the exhibition led some of the research direction. The shape of the projection surface references the grid systems used to divide, map and model the Earth. The lines of the grid have become voids; spatial interstices where knowledge can be imagined from different viewpoints, scales and beliefs.

How did this collaborative process make you reflect on your own domain?

GL In my opinion, for an art-science collaboration, or indeed any collaboration to be meaningful, there always needs to be some time for genuine interest on both sides to develop. In art-science collaborations, it is often the case that an artist or designer's discipline is seen as being to visualise or even aestheticise the work of the scientist. And it is true that in many cases, that is the easiest starting point for such a collaboration.

At the same time, I am looking for other ways to be involved in the work of science. In this case, that is through trying to engage with earlier stages in the simulation of Earth by questioning the parameters and goals, the research output, and the belief involved in the technical processes behind these simulations.

I also think that it is often expected for art-science collaborations to be productive in the sense that they need to have a material and clear outcome. But a lot of tacit, unspoken exchanges happen through engaging with practices from other disciplines. This can shape how one thinks about and practises one's work, which to me is just as valuable.

Can you speak more to the role of the visual, in both design and science, as a means of negotiating knowledge gaps?

GL I think this collaboration was essentially two visual practitioners reflecting on their way of reading, analysing, and producing content with very different languages to discuss and materialise these images. There were often misunderstandings surrounding what we thought was a 'good image'. For example, from Neagul's perspective an image without any clouds in it is an optimal

image, because these images have more value by giving more information about different environments, such as land usage, or forestry. I, however, was interested in the clouds, and wanted to work with the rawer images—those without any additional alteration. This was because the rate of change between these images was greater, so the effect of interpolation in the video would be more readable and conceptually closer to what the project was trying to say.

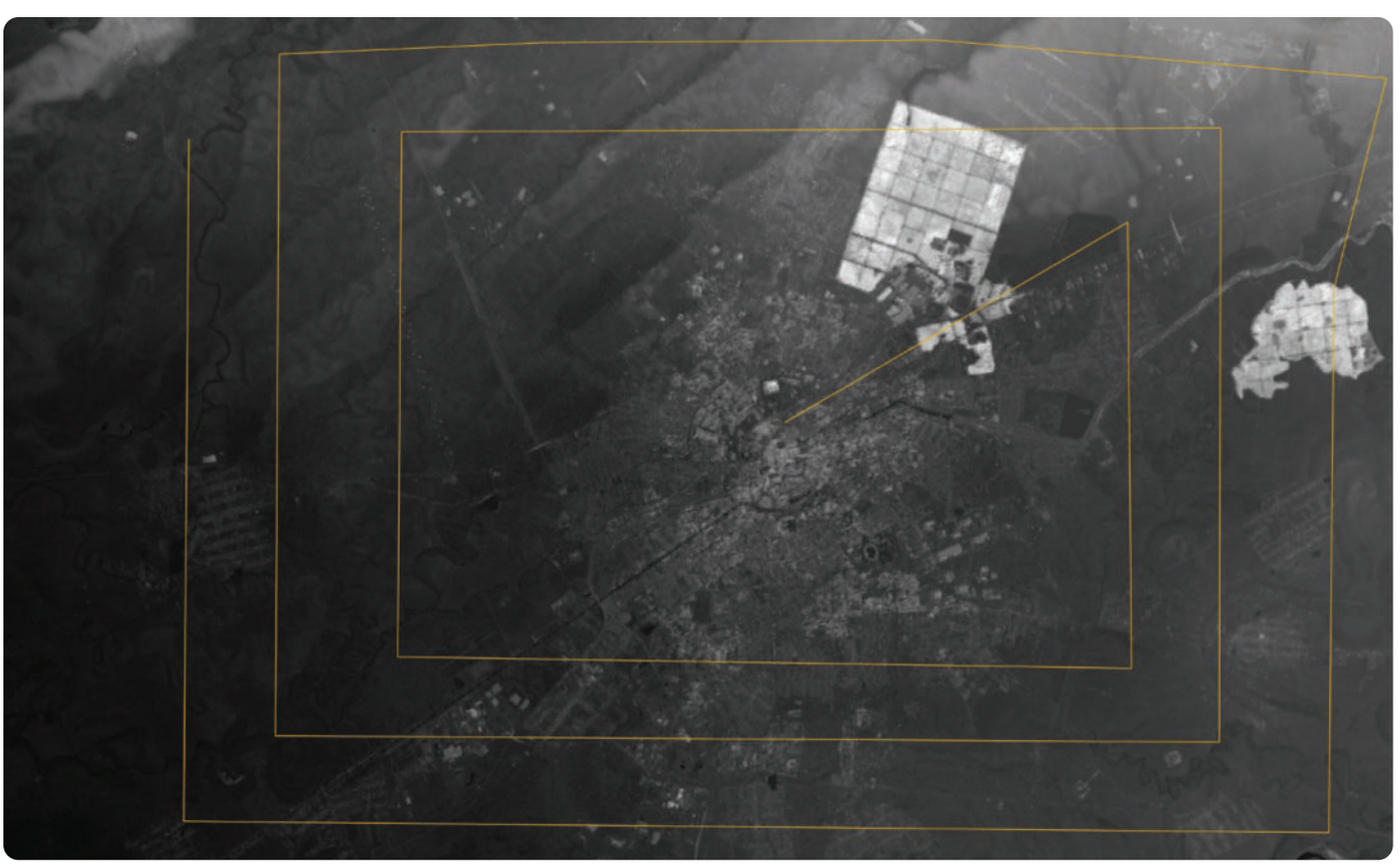
A lot of things that were discussed orally were misinterpreted on both ends due to linguistic and disciplinary differences. It was only when we started working through the actual process of exchanging images and visual content that the work really unfolded, and it became clearer what the project would look like.

The aesthetics of simulation suggest a logic of optimisation. How do you view the theme of optimisation—or lack thereof—in your own work?

GL Optimisation is an inherent part of both human and machine decision-making, and it can be implicitly inherent to the practice of simulation. Through optimising, information is equally enhanced and suppressed, and that was one of the theoretical and technical starting points of the project. By understanding what is optimal for the system being dealt with, the beliefs and ideology woven into the system itself can be understood.

As mentioned, in the installation there is a voice-over. This voice-over asks what is optimised or incomputable and therefore what information is lost and what information is created. This is a questioning of the bird's-eye view synthetic visuality of the Earth. The voice-over goes on to ask: what other 'optimised' visuality could help reframe the current mediation of the technological gaze on our understanding of the Earth?

Credits
All images: Screenshots from the installation film 'From Here to the Cosmos: Incomputable Views of the Above, Under and Around'
Image extraction: Dr Marian Neagul
Interpolation script: Isaac Clarke



Spatial mapping before frame extraction

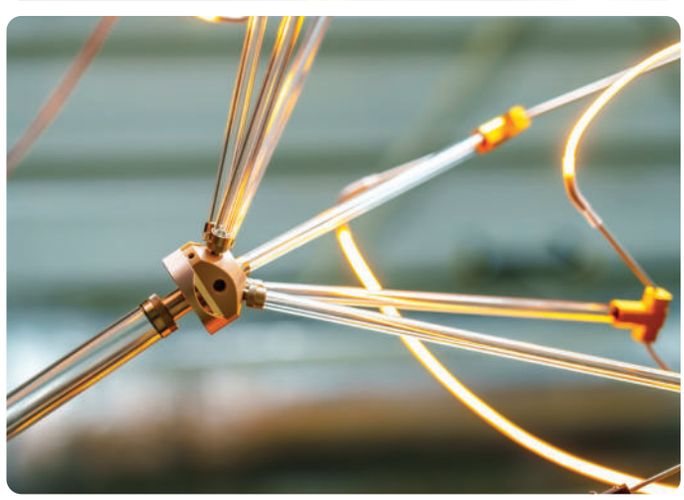
Shining a Light on Production Systems

INTERVIEW 09.08.2023

Production systems are optimised for specific outcomes through meticulous design. They harmonise material, technology, supply chains, human resources, and infrastructure to create tangible objects. These objects validate the effectiveness of the systems. This is especially evident in Hamilton, a major player in medical and laboratory instrument manufacturing, with its Timișoara facility ranking as the second-largest in Europe. How can this implicit expertise and design be mapped, made tangible, and potentially reapplied?

Turn Signals—Design is not a Dashboard features two lighting objects produced by Théophile Blandet during a one-month residency at the Hamilton facility in Timșoara. Blandet is a French artist and designer based in the Netherlands. His practice stimulates spurious narratives by bringing together the antithetical logics of sophistication—as in engineering precision and industrial production—and the haphazard—such as material bric-à-brac and eccentric pop culture. The result is 'infra-ordinary' objects that resist efforts of categorisation, rather evoking a metamorphic disruption.

In this interview, Blandet talks about the process and result of his residency.



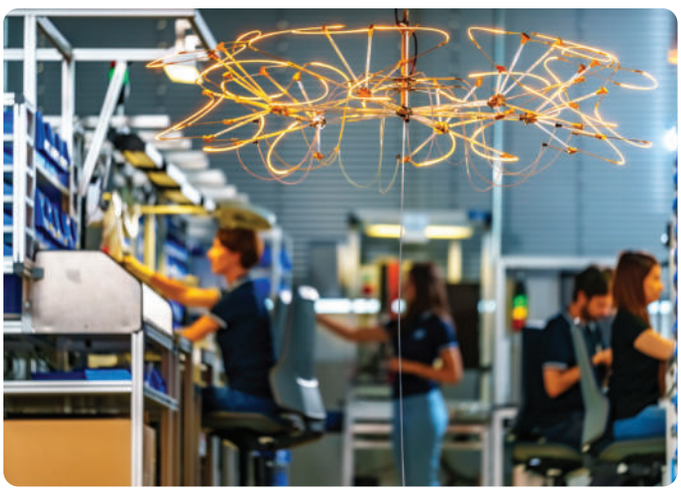
What do the lighting objects on show in the Turn Signals *exhibition represent?*

Théophile Blandet These lamps are a collage of my interaction with Hamilton, mapping my complete assimilation into the factory's environment. They are crafted from high-tech parts that cannot be found anywhere else, and are made using the high-tech processes and valuable knowledge I had access to. The people at Hamilton generously shared their expertise in rare materials and advanced manufacturing capacities with me. Drawing inspiration from their innovative manufacturing processes and diverse departments, I integrated their systems and repurposed them to create atypical objects that deviated from their usual production line of medical devices such as precision syringes and ventilators. The project was intentionally designed to disrupt their controlled production lines, causing interference and asking them to dedicate a part of their line to fulfil my requests. This concept of disruption became the core of my working method resulting in the development of two lamps.

Working as an embedded researcher and designer within such a tight timeframe is a distinctive methodology. What was your approach?

TB Although my goal was to develop a completely new product within a strict deadline, my approach was to arrive at the factory devoid of preconceived ideas and preparative drawings. My intention was to immerse myself in the logic of the factory for a month, adapting myself to its rhythm, working closely with its people, and developing a project that encompassed all of the departments, ranging from Research and Development to Manufacturing.

During the pandemic, Hamilton swiftly adapted to the challenges and set up new assembly lines to produce ventilators, and similarly, it responded to my intrusion with agility. I was granted complete access and faced no limitations regarding production methods. All my



requests were treated with utmost seriousness and were immediately considered and executed.

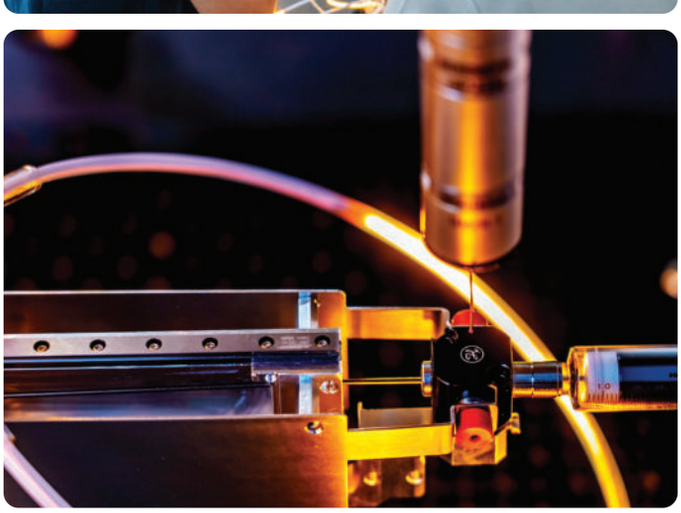
You described your approach to Hamilton's controlled environment as disruptive. Can you elaborate on this?

TB When I arrived, I initially familiarised myself with the company's internal structure, their existing products, and the materials they used in their manufacturing processes. However, one of the most valuable aspects of my research involved a daily ritual of examining the 'red discard boxes' present on each workstation at the factory. These boxes contained parts that were rejected during the previous shifts. Over the course of my stay, I meticulously collected these discarded parts, accumulating a treasure trove of materials. Among the items I gathered were raw stacks of rods made from materials such as Brass, PEEK, and transparent Teflon, as well as gold-coated parts. I also salvaged syringes that had been discarded due to minor defects that only the skilled workers could identify.

By amassing these discarded materials, I found significant resources and insights that directed the evolution of the project, and disrupted the expected values and outcomes of the system. The personnel called it the 'special project', as their usual product outcomes were efficiency-based, designed to endure a million cycles before reaching clients. With access to their materials, when it came to production of the lighting objects, I instead adopted a sculpting method, adding elements day by day, and harmonising with their production. This fluid composition evolved with my findings and surroundings, allowing for changes. The unconventional requests I made further solidified the 'special project' moniker.

Would it be accurate to characterise the project as a complex collaborative endeavour?

TB Yes, the project represents a fluid interaction resulting in a symphony, akin to an orchestra without partitions. I took on the role of a conductor, and Hamilton, in turn, acted as the orchestra. Together, we created a symphony. Directing this orchestra was smooth and allowed for a great sense of creative freedom. It involved a continuous exchange of ideas and discussions, fostering a collaborative sharing of knowledge. As the conductor of this creative symphony, my goal was to draw on a broad spectrum of the factory's methods and tap into the diverse skills of the personnel, which I could never fully master due to their technical specificity and precision. The project's realisation relied on the proficient individuals at the Hamilton factory, who played a vital role in giving form to the lighting pieces. This fruitful collaboration with over 30 individuals resulted in lighting objects that stand as a symphony of technical brilliance, showcasing a harmonious fusion between designer and factory.

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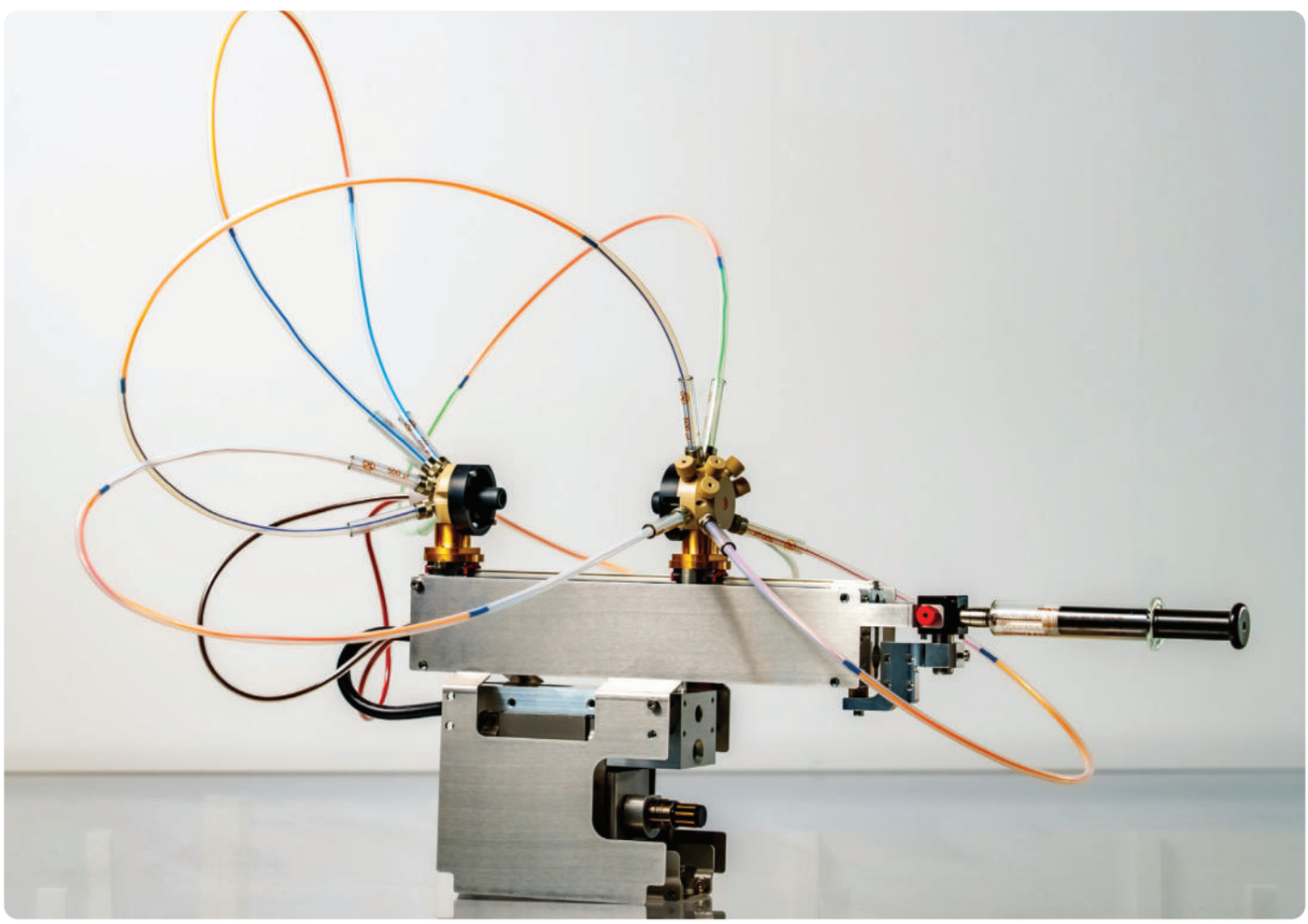


The Archive is Spinning

ESSAY 22.10.2023 TEXT BY PETRE MOGOȘ AND LAURA NAUM

‘The City is Spinning! Timișoara’s Print Ecologies Then and Now’ explores the interconnected history of Timișoara’s print industry within the broader context of the city’s changing material conditions, emphasising its role as both an influencer and product of industrial ecologies across different sectors. Presented in an interactive, non-linear timeline format, the project highlights the importance of micro-histories and challenges traditional historical narratives, underscoring the adaptability of historical narratives in shaping our understanding of the past and future. In this essay, Petre Mogoș and Laura Naum of *Kajet Journal* reflect on the importance of using design to interrogate and reconstruct archives.

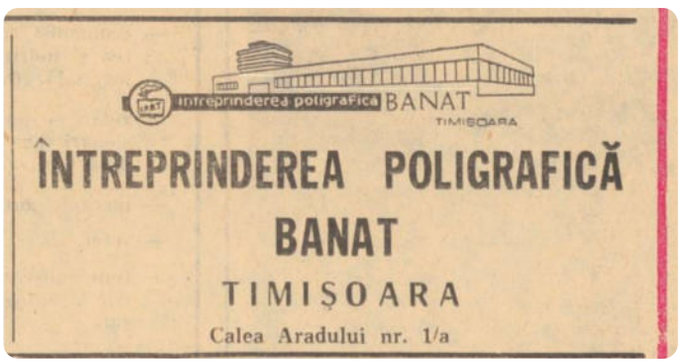
Flacara, 1969

Munca, 1970

Timișoara’s complex histories describe a city in flux; a city with a changing metabolism and a certain type of vitality that not all cities possess, one that informs and is informed by both global resource networks and local industrial ecosystems. At the core of these transformations has been, since the eighteenth century, Timișoara’s multifaceted printing industry: a dynamic force, serving as a significant node within a broader industrial network that defined the city. Hailed as the ‘Manchester of Hungary’ by economist Lendvai Jenó for its remarkable industrial expansion, Timișoara boasted one of the most diverse, cosmopolitan, and dynamic print cultures in the region at the turn of the twentieth century. Prior to World War II, a total of 584 newspapers were published. The majority of them were in languages commonly spoken in the area—138 publications in Romanian, 163 in German, and 176 in Hungarian. Additionally, there were approximately 100 bilingual or trilingual publications; five in Serbian, one in Bulgarian, and one quarterly in Esperanto.

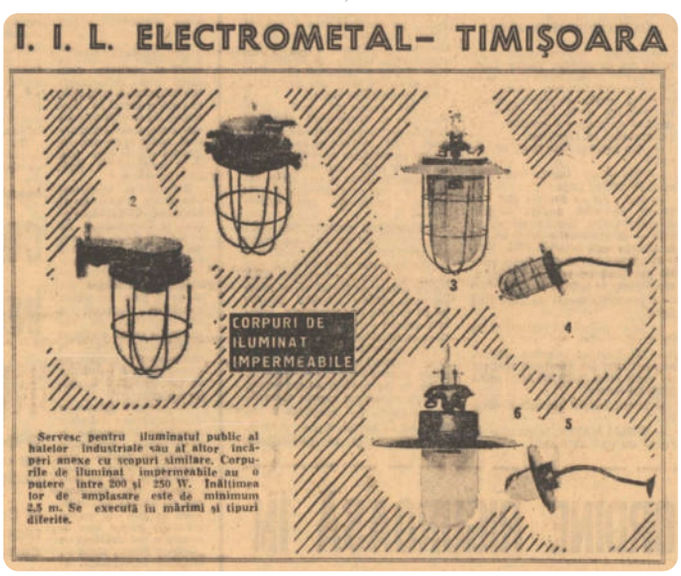
What sets Timișoara’s print culture apart, alongside its evident cosmopolitanism, is its embeddedness in local and regional industrial ecosystems. Timișoara’s periodicals are more than just passive observers that chronicle the city’s evolution. They go beyond documenting its transformations, evident in the millions of printed pages dedicated to local affairs. Instead, they emerge as active participants, shaped by the city’s interconnected industrial infrastructure, and directly contributing to the generation of new developments. This underscores the imperative of situating them as both expressions of culture and of industry, within a broader context that is enmeshed in wider and more complex historical, industrial, and political webs that span from the era of Habsburg dominance to the contemporary landscape of post-socialist neoliberalism and the challenges brought forward by global digitalisation.

Drapelul Rosu, 1972



Drapelul Rosu, 1972

Munca, 1973



Satul Socialist, 1974

It comes as no surprise, then, that the beginning of Timișoara's printing legacy is intertwined with the city's colonial ties with the Habsburg empire. The establishment of the first printing presses in 1771, 1787, and 1851 respectively was contingent on the hard to obtain imperial privileges that only few colonial settlers or wealthy merchants benefited from. Without these influences—be they Ottoman until 1716, Habsburg until 1919, socialist in the second half of the twentieth century, capitalist after 1989—it is difficult to envision how Timișoara would have evolved into a cultural and industrial nucleus. Consequently, a nuanced examination of Timișoara's cultural landscape cannot afford to disregard these transformative influences.

For our physical installation titled 'The City is Spinning! Timișoara's Print Ecologies Then and Now', we employed various chronologies that shed light on these transformations and give voice to previously overlooked narratives in Timișoara's otherwise rich print culture. Anchored in archival research, our methodological approach involves reassembling Timișoara's print legacy through the utilisation of a meta-mechanism: we exclusively rely on printed material in order to make sense of print as a medium. Drawing on historical records dating to as early the nineteenth century up until today, including newspapers and magazines, we piece back together an otherwise scattered and fragmented cultural history. Three timelines resulted from our research: the industrial history of Timișoara, providing a contextual backdrop of the entire industrial landscape of the city; the social history of Timișoara zooming in on print industries, their material infrastructure, and the evolving role of print as a trade undergoing professionalisation and unionisation; the cultural history of printing, spotlighting print culture as a form of knowledge, artistic, and cultural production.

This approach, situated at the crossroads of critical mapping and archival research, is not unfamiliar to us: as editors of *Kajet* (a printed journal focused on unearthing Eastern European intersections and encounters), we engage in processes of self-historicisation, and of writing and documenting the histories around us; while as archivists of Camera Arhiva (an archival platform that digitises Romanian printed matter published between 1945 and 1989), we speculate about what archives could potentially mean by contesting the expectations of grand historical narratives. Through both projects, the act of archiving is brought forward as a means of uncovering social realities that are often brushed aside from dominant narratives, and as a means of exploring futures that perhaps never came into being.

In this light, our act of archiving (as well as the resulting method of archival research) serves a purpose beyond mere preservation and remembrance. It first and foremost functions as a mechanism enabling us to articulate new futures: a speculative exercise that allows us to reconstruct alternative worlds that have been discarded from collective memory by the status-quo and a linear, teleological understanding of history. To some extent, we aim to consolidate a conspicuously absent history, crafting our own timeline of the past (not in an anti-empiricist or counterfeit way, but in an empowering, imaginative manner). It entails a shift in focus from totalising and totalitarian master narratives toward micro-histories that failed to be included in the official annals of modernity in the first place.

One such forgotten micro-history is, for instance, Timișoara's clandestine legacy, where local printing

Revista De Chimie, 1975

presses acted as catalysts for change in times of crisis. While it is widely acknowledged that written text played a pivotal role as the primary form of propaganda employed by the resistance movement against Ion Antonescu's fascist regime in Romania during the World War II, it is less known that the enduring resistance movement, organised around the infrastructures of the (then illegal) Communist Party, relied on extensive clandestine operations that spanned over a decade and a half. At the heart of these resistance movements was a dynamic print industry operating from the underground. Between 1940 and 1944, the Communists used six covert printing operations, equipped with printing machinery (strategically placed, three in Bucharest and one each in Iași, Brașov, and Timișoara). This afforded a reservoir of experience that very few other anti-fascist political factions could claim. In Timișoara alone, ten publications of the Romanian Communist Party were produced, accounting for half of the twenty communist publications circulating throughout the entire country during that period. The clandestine facilities in the Banat region were instrumental in printing publications of national significance, such as 'Scînteia' (*The Spark*), 'Dunărea roșie' (*Red Danube*), 'Presa liberă' (*Free Press*, later succeeded by 'România liberă', *Free Romania*), and 'Apărarea' (*The Defence*).

Beyond offering an overview of Timișoara's partisan history, our research also highlights the pivotal role played by printing presses in the union movements and social protests of the Banat region. Timișoara holds historical significance as the birthplace of the first association of labourers in 1868, and in 1921 the printers' guild achieved a notable milestone by becoming the first regional organisation in Romania to regulate working conditions, institute holidays, and provide compensation for overtime work. It is therefore necessary to position Timișoara's print industry as a forefront player in broader social phenomena, reclaiming its status as an agent for upholding workers' rights and protesting against precarious conditions. The first general strike in Romania, which took place around the same time, in 1919, involved over 20 000 workers across the country who followed the lead of printing workers in cities like Timișoara, Iași, and Bucharest. Fast forward half a century later, and Communist authorities took note of print workers' role in the labour movement, establishing the 'Printers' Day', which has been celebrated every year starting with 1968. The day is not chosen by chance, as it marks the exact 50th anniversary of the 13–26 December 1918 events, when print workers took to the streets in order to advocate for improved working conditions.

Another micro-narrative that has resulted from our archival research, and that is included in our installation, delves into the close collaborative relationship between local industries and design education in Timișoara. By pinpointing the early 1970s as the formative period when the initial strides were taken to formalise the discipline of design in Romania, archival sources situate the evolution of design in the context of industry: although at first glance distant and disconnected, both fields share commonalities, underscoring a dynamic interplay. This is inter-woven through various key events, such as the inaugural national design conference in Romania, where design principles were officially outlined for the first time, the experimental undertakings of the High School of Fine Arts in Timișoara (summer exchanges, workshops, specialisation programmes, interventions in the public space), the pivotal role played by the Timișoara-based Sigma art collective as a hallmark of a radically


La Intreprinderea mecanică din Timişoara a fost consemnată, zilele trecute, o nouă realizare de prestigiu a inteligenţei tehnice româneşti. Colectivul de la I.M.T. a închegat cea dintîi combină minieră de înaintare în steril, parte a unui ambiţios program de asimilări. Prevăzută cu un sfredel, manevrat hidraulic în toate direcţiile, combina numără 32 de subansamble mari şi are capacitatea de a înainta 6 metri pe zi într-o galerie cu profil de 12. În imagine, lăcătuşul Iosif Vidu şi maistrul Arcadie Podgurschi, ambii din secţia maşini de transportat, fac ultima toaletă a acestui „tanc" paşnic, pus în slujba ideii de a scoate din pămînt cît mai mult minereu.

Flacara, 1980

ANCHETA RL

AVEM DESIGNERI. CINE BENEFICIAZĂ DE IDEILE LOR ?

● O experiență timișoreană care a început promițător ● De la neîncredere în virtuțile design-ului la comenzi industriale ● Șansa unei colaborări școală-întreprindere aflată cam de mult în studiu ● „N-am lucrat decît o vară, dar asta a însemnat 17 000 lei beneficiu !" ● Un director cam sceptic și alți patru nerăbdători să preia oferta designerilor ● O componentă a tehnologiei moderne și drumul cel mai sigur spre calitate și rentabilitate

În rîndurile de față ne-am propus o anchetă printre specialiștii în design, proiectare, inginerie tehnologică etc. din Timișoara, referitoare la relațiile care există (sau ar trebui să existe !) între creatorii designeri și beneficiarii lor potențiali din industrie. De ce Timișoara ? Sigur, puțini cunoscători ai amănuntului că în acest important centru industrial, cultural și de învățămînt al țării există de cîțiva ani un liceu profilat pe studierea designului în cadrul disciplinelor școlare. Fără a i se fi asigurat statutul, să-i spunem, „juridic", de a-l practica oficial, designul este predat în cadrul liceului de muzică și arte plastice „Ion Vidu", pentru că profesorii-creatori de la materia respectivă sînt bine pregătiți în această direcție. Și, în al doilea rînd, pentru că s-a considerat că o asemenea orientare în pregătirea și formarea generațiilor de elevi ai liceului este foarte necesară pentru economia țării și, desigur, pentru abilitarea unei *meserii*, a unei *profesii* indispensabile oricărei industrii moderne, ce se vrea competitivă la toate capitolele.

Experiența timișoreană de atunci (au trecut 8 ani) a fost întîmpinată cu entuziasm. Interesul stîrnit de inițiativele „școlii de design" de pe malul Begăi a fost încurajator și s-a soldat cu colaborări fructuoase cu industria locală, dublate de prezențe publice — expoziții — destul de frecvente și de fiecare dată, bine primite. Acesta a fost începutul. Apoi...

Profesoara Mioara Plavosin, directoarea adjunctă a liceului, evoca un proiect din 1978 cu privire la înființarea „de jure" a Liceului de design patronat de Ministerul Industriei Ușoare, proiect care la un moment dat a fost foarte aproape de a se materializa. În fond, toate datele concrete ale procesului de înființare existau deja, totul limitîndu-se, de fapt, la schimbarea tutelei. Ceea ce s-ar fi realizat cu adevărat, era *cadrul organizatoric al activității practice* a viitorilor creatori-designeri, în chiar unitățile M.I.U., destul de numeroase în județele sud-vestice ale țării : Timișoara și Arad. Beneficiul ar fi fost reciproc și întreaga muncă a celor care se ocupă de soarta designului la Timișoara ar fi căpătat un plus de certitudine și de obiectivare, statutar reglementate. Dar acest pas nu a fost făcut încă. Și, totuși, școala de design de la Timișoara există ! O atestă activitatea ei zilnică și cîteva reușite le vom cita în continuare spre edificare : o uneltă electrică rotopercutantă (designul și ambalajul) pentru Întreprinderea „6 Martie" Timișoara ; ambalaje pentru săpunurile produse de „Azur" Timișoara ; schema de design și funcționalitate a unui

Corneliu Antim

(Continuare în pag. a 5-a)

Trei tipuri de triciclete — karting, scuter, sport —, care nu și-au găsit încă producătorii. Au aceeași destinație, folosesc aceleași componente, produse curent de industria noastră și, totuși, o notă aparte le deosebește fundamental între ele și de ceea ce în mod obișnuit fabricile de jucării oferă micilor lor beneficiari: fantezia, bunul gust, eficiența. Creatori designeri : Constantin Berechet, Lucian Toma și Vasile Cristian

Romania Libera, 1981

experimental pedagogy, and, lastly, the collaborative ventures between high-school students (as designers in the making), their teachers (Sigma members and other artists from Timișoara) and local factories. Among them, we mention Electrobanat, (today, Elba one of the country's most important lighting companies), 6 Martie (formerly a state-owned company dedicated to the mechanisation of construction works; post-1989, the Timco Halls transformed into a contemporary art exhibition space), and Azur (a paint production company with a rich pre-socialist history; since 2017, the FABER cultural centre operates inside a former Azur industrial complex). Through intergenerational and interdisciplinary collaborations, these entities devised and assembled urban furniture, public lighting systems, electrical tools, packaging for consumer goods, as well as household items like ceiling lamps and television models.

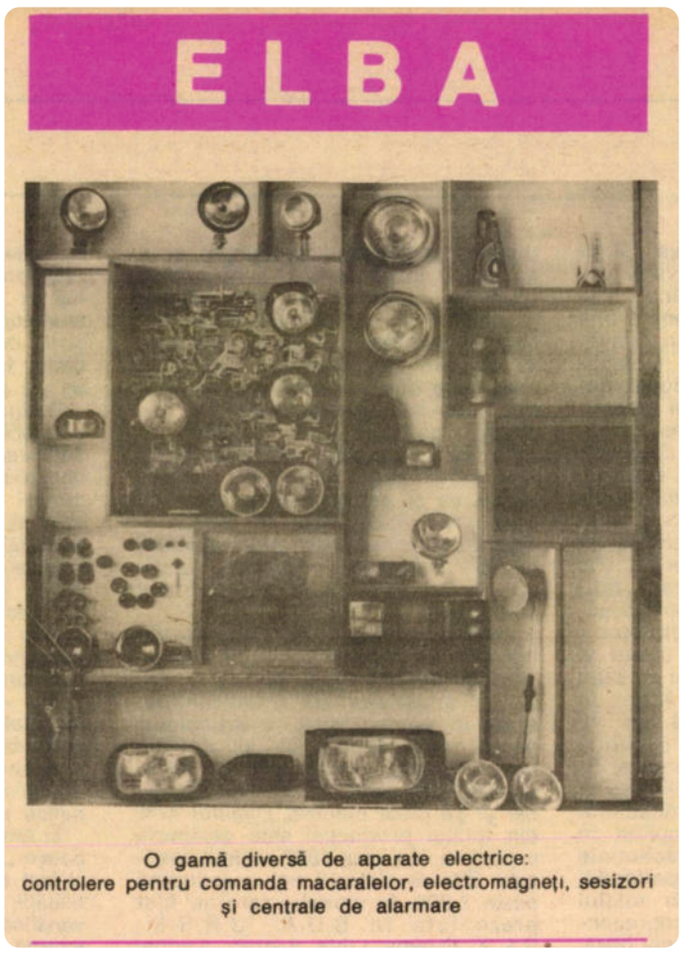
As part of our contribution for the Bright Cityscapes programme, we consciously sought to deconstruct the official threads that articulate what is widely regarded as 'common knowledge' with regards to Timișoara's industrial legacy. To achieve this, we augmented these narratives by identifying gaps and absences, by incorporating new layers of unofficial histories (first and foremost coming from periodicals archived by the Arcanum database and our research project Camera Arhiva). It is precisely because archives are sites of political struggle in their own right—fragmented and incomplete, the result of bias, filtering, and triage, not literal transmissions of 'what happened', but a one-sided, mediated (and thus contested) layer of an otherwise complex history—that we need to tread carefully on such grounds. And it is precisely because the archive (supposedly with capital A, akin to History with capital H) is inherently prejudiced, because it is the result of human design and human decision making, and because it is a result of human error and human violence, that the archive needs to be read between its own lines. The patchwork of micro-threads that unfolded in this project not only offers a more nuanced understanding of Timișoara's industrial heritage, but also serves as a poignant reminder that such narratives (that also come in scraps and bits and pieces) possess the potential to change how history is, on the one hand, recorded and, on the other, remembered.

Pagina a 5-a — 12 februarie 1981

Avem designeri.

Cine beneficiază de ideile lor?

Romania Libera, 1981



Era Socialista, 1983

Fortepan, 1989

5. Continuations —designers deepening practices

Set-jetting in an Outsourced Country

INTERVIEW 16.08.2023

Romania's landscape and folklore have become significant in global pop culture and its industry, yet their origins remain obscured. In this interview, Simone C Niquille explains the thinking and process of developing the Landscape Mode scenographic installation in *Turn Signals—Design is not a Dashboard*, including her research into film location databases, 3D libraries, and AI-generators to create a proxy representation of an outsourced country.

How would you describe the essence of 'Landscape Mode'?

Simone C Niquille Online travel agency Expedia confirms that 'set-jetting', travel inspired by movies and TV shows, is the top source of vacation influence, outranking social media. With a similar ambition, the Tourist Board of Ireland has partnered with Ubisoft of the Assassin's Creed game series to attract tourists. The game is famous for its historical settings, so much so that a 'Discovery Tour' mode has been added for players to take virtual tours of ancient Egypt, Greece and Ireland.

As a popular film location, Romania has experienced its share of set-jetting. Following the release of Tim Burton's hit Netflix series *Wednesday*, tourism to Romania experienced a boom, immersive bus tours to the various film locations fully booked. The series, although set in Vermont USA, is filmed across numerous locations and film sets in Romania. In Burton's words: 'Trying to make Romania look like Vermont was an interesting challenge, but we felt like we found lots of new locations.' The series star Jenna Ortega commented on the location's accuracy: 'One of the places we went to was Sinaia and everything looked Photoshopped.'

The Romanian landscape, cities and landmarks have acted as proxies for New Jersey, the Appalachian Mountains, Paris, Moscow, the American South and more in various films and television series. Sometimes the reasons are financial, as the country offers substantial incentives to support the local film industry. Other times the authenticity of Romanian film locations is superior to 'the real thing'. In the movie *Cold Mountain*, set in 1860s North Carolina, the Carpathian Mountains offered certainty of snowfall and less modern-day infrastructure to remove in post-production, compared to the actual Cold Mountain in The US. The same 'wilderness' attracted Panasonic to shoot several camera commercials in the country.

It's a fine line between the actual life in a place, and projection of a cliché, a stereotype produced through media. Similarly, Romania is no stranger to pop culture references with werewolves, vampires, giants, and ogres deeply rooted in local culture and lore. Over time these characters have been absorbed by mainstream entertainment and inspired entire IP franchises, such as Shrek, Dracula, The Wolfman, the Twilight series, Buffy… an entire catalogue of gothic fantasy.

Panoramic backdrop of 'Landscape Mode'

What methodologies did you use to investigate this compelling insight?

SN An overview of the proxy locations in Romania and the reasons for choosing a location were established by searching through film location databases and production company portfolios. A map was created of films, series, advertisements and games produced in Romania, and whether the locations served as proxy for another location (many of course were filmed in Romania as the story is based on its landscape).

To create the tapestry, as well as some of the characters, a collection of digital artefacts that relate to either the Romanian landscape and lore or the proxy landscapes Romania stood in for, were sifted from the 3D asset libraries of Sketchfab and Polycam—the largest repositories of downloadable 3D scans online. Online libraries of scanned 3D data are a curiosity cabinet filled with reality fragments. Uploaded by geology research institutes, real estate agencies, tech enthusiasts, game designers, land survey companies, the scans cover a wide spectrum of intentions and applications. Surprisingly all geographies were represented, even if only a 3D-scanned tree stump from Appalachia, a stone from Vermont. Clear documentation of file sources and metadata were recorded while collecting them and are shared on the maps in the exhibition space.

Recently launched text-to-3D asset AI generators ShapE and LumaLab imagine 3D were also used as data sources. LumaLab has an online accessible archive of all user-generated 3D models. This archive was used to search for prompts such as 'werewolf', 'vampire', 'ogre', and 'Romania' to give a glimpse into the popular imagination (or better said, data) of these folkloric characters turned pop culture content. ShapE was used to generate characters, prompting the universal regurgitation of the formerly local and mythical.

How are the AI-generated images to be understood in relation to the proxy representation of Romanian landscape and culture?

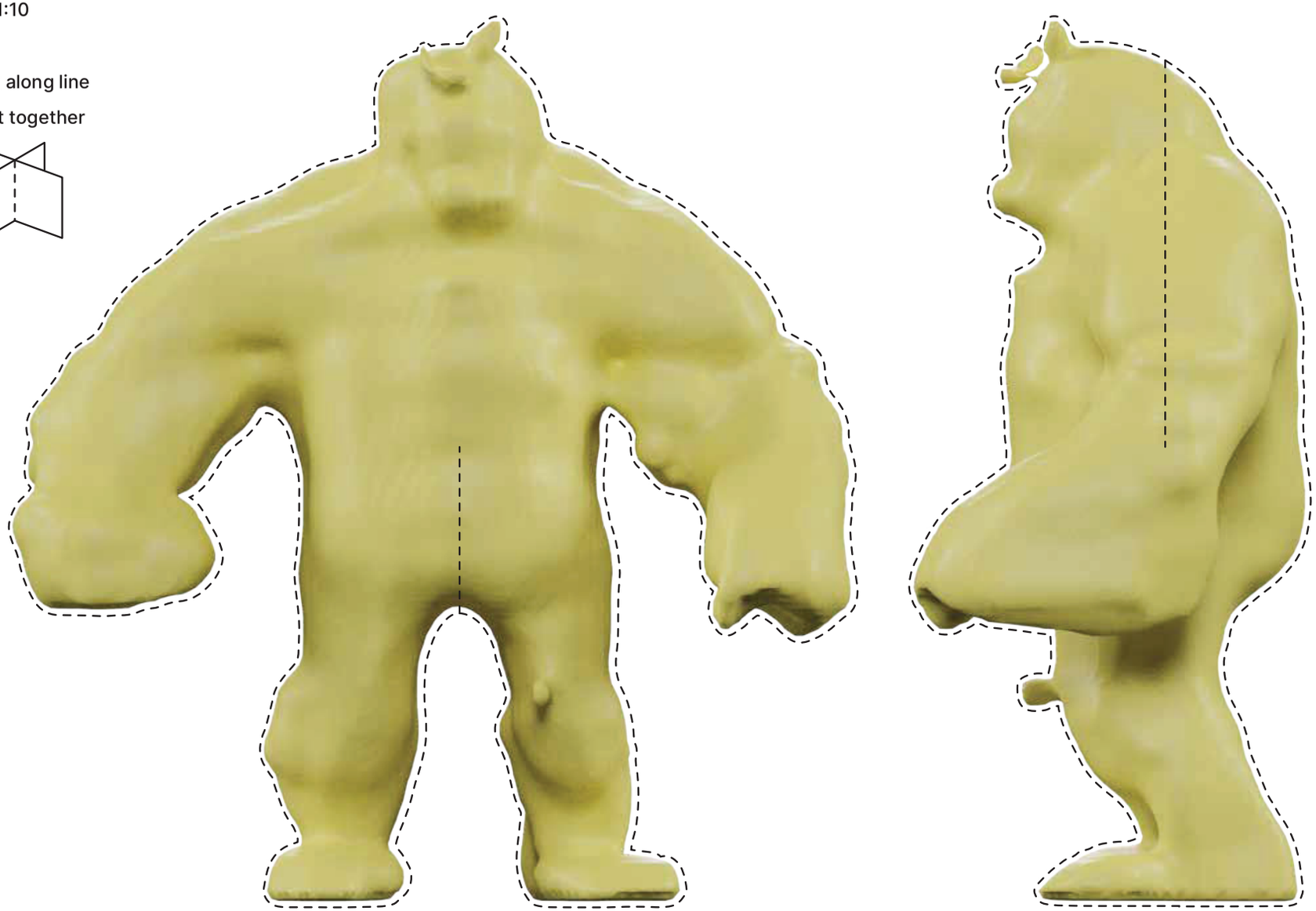
SN For a text-to-3D generated AI to function, massive amounts of training data need to be available. Prompting it to generate a 'werewolf' does not in fact produce The Representation of the folkloric character but instead is an amalgamation of all the training data that is associated with the label 'werewolf'. To end up as training data, information needs to be easily and widely available. Training datasets are often scraped from online sources rather than created from scratch and offer a strange portrait of what a particular something is according to the data available online. The werewolf then is neither a 'good' or 'bad' representation, that binary becomes trivial. Rather it is a glimpse into the available data, which offers a popular version, a homogenised imagination. Prompting an ogre generates William Steig's *Shrek*, popularised by the 2001 DreamWorks feature animation.

How did you incorporate all these elements into the photo background for visitors to experience the outsourced land at the Turn Signals *exhibition?*

SN In the 3D software Blender these characters and landscape fragments were assembled into a tapestry that is installed in the Turn Signals exhibition. The installation is inspired by tourist souvenir snow globes that cram all the 'must-see' attractions into the tiny space of a globe not larger than the palm of one's hand. It borrows from the aesthetic of a film set, with a backdrop to simulate the landscape while characters roam in the foreground. The characters are printed on re-board, a thick cardboard used to construct temporary expositions, and fair booths. Exhibition visitors are invited to pose and take photos with the characters: Welcome to 'Landscape Mode'—a place where everything looks eerily familiar, a ghost of binges past, a faint memory of childhood fairy tales, a composite of content.

A normal ogre
Generated with Shap-E
Scale 1:10

1. ✂ along line
2. Fit together



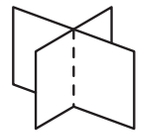
Landscape Mode
Simone C Niquille /technoflesh Studio

2023

(Download this file via brightcityscapes.eu)

Funko pop toy of Wednesday Addams
Generated with Imagine 3D by LumaLab AI
Scale 1:10

1. ✂ along line
2. fit together



Landscape Mode
Simone C Niquille /technoflesh Studio

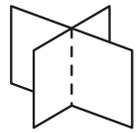
2023

(Download this file via brightcityscapes.eu)

Stone from Appalachia, North Carolina USA
Scanned by @BrianZimmer, Sketchfab
Scale 1:10

Low poly werewolf
Generated with Imagine 3D by LumaLab AI
Scale 1:10

1 ✂ along line
2 fit together



Landscape Mode
Simone C Niquille /technoflesh Studio

2023

Different Infrastructure, Different Promise

INTERVIEW 07.09.2023

In the late 1990s and early 2000s, Romania witnessed the emergence of grassroots internet networks colloquially known as block or neighbourhood networks. They originated from an amalgamation of devices, neighbourly affiliations, and urban configurations, serving as a unique medium for internet access that extended from individual apartments to entire neighbourhoods.

These block networks are the subject of Cristina Cochior's 'Block Networks' project included in the *Turn Signals—Design is not a Dashboard* exhibition. 'Block Networks' is a chronicle of a transformative period when residents from Timișoara and other areas in Romania devised inventive solutions such as stringing cables across balconies, or between houses, to facilitate collective internet access and self-reliant services. It incorporates oral histories, online forums, news articles, and assorted documents displayed on interconnected computers, proffering insights into the socio-political and economic contours that marked the trajectory of these networks and their eventual amalgamation into prominent commercial entities.

Based in the Netherlands, the Romanian Cochior's design and research practice largely comprises investigations into the intimate bureaucracy of knowledge organisation systems, and more recently, collective and non-extractive digital infrastructures. In this interview, she gives insight into the process of creating the 'Block Networks' project, and what she believes it reveals about relationships with technology and industry.

Can you give a brief insight into the topics you engage with in your practice?

Cristina Cochior Much of my work is concerned with various aspects of grassroots infrastructure. The work of Varia, the Rotterdam-based collective that I'm part of, focuses on everyday technology, and we maintain our own digital infrastructure, exploring how social organisation influences our decisions and tools.

This enables us to understand how people use technology to organise themselves and foster a sense of community. I'm intrigued by the mutual processes of alignment that occur when specific technologies are employed. It's not just about the usage of technology but also how it influences and shapes communities themselves.

Additionally, I also work a lot with archives, examining how organisational logics affect access to information and perception. For instance, part of 'Block Networks' entailed building an archive of interviews and other snippets that were found on the internet, in articles or forums; mostly it's an attempt to gather specific knowledge that is either oral or written.

Another project I've been working on with Manetta Berends and Sofia Boschat-Thorez, resulted in a publication called 'Vernaculars Come to Matter', which investigates vernacular forms of information organisation. We question how standardised software impacts the way we receive information.

Our focus is on language processing tools, like the NLTK (Natural Language Toolkit). We playfully named our project VLTK (Vernacular Language Toolkit) as a response to it:

> 'VLTK takes a dive into the logical operations that are used to process language with a computer to speak back to a range of unassuming habits in the field of computational language processing, and step towards modes of embedded, slow, and vernacular language processing and knowledge organisation.'[1]

The design that you are concerned with is not often visual. How do you work with invisible design in your projects?

CC Infrastructure can be challenging to trace, but in 'Block Networks', I collected interviews and anecdotes to understand the practices behind maintaining these networks. This anecdotal knowledge sheds light on the intersection of vernacular social organisations and technical work. For example, people often employ everyday objects creatively, like using a five-litre plastic bottle to shield antennas from the rain.

Although these visceral examples come up, my approach is more oriented towards recognising design as how people use technology and how it shapes their practices. For example, it's essential to acknowledge that the people who maintain these infrastructures also serve as access points through their specialised knowledge of these systems. They become integrated into the infrastructure, as they assist in computer repairs, troubleshoot issues, and even provide free computer classes to students, as one of the interviewees mentioned.

How do you view the theme of optimisation in 'Block Networks'?

CC Optimisation always raises the question: optimisation for whom or for what? Within the tech industry, optimisation is used to minimise costs and increase performance. Researcher Seda Gürses, who's done a lot of work around this topic, argues that optimisation-based systems are made not only for the extraction of value from user behaviour, but also for behaviour manipulation.

In 'Block Networks', optimisation similarly appears from the perspective of minimising costs, but it involves the users in the process of defining the needs for which to optimise. The project explores how people started micro ISPs out of necessity, often for their own internet access, and this shaped unique user-service provider relationships that are not only determined by an economic interest but also by the local community connections that constitute them.

This type of dynamic relationship between practices and services is intriguing, particularly when it isn't yet standardised. It allows for flexibility, as there is the possibility of responding to and adapting to a particular situation that a user might be in. This evokes Lauren Berlant's assertion that what constitutes infrastructure are the patterns, habits, norms, and scenes of assemblage and use.

In the block networks, a community-oriented pattern became prevalent, shaping the dynamics of the relationship between service providers and recipients, resulting in unique and somewhat unconventional forms of entrepreneurship.

One of the individuals I interviewed hesitated to label their work as a business, lacking a more suitable term. However, there was an awareness of the multiple layers of meaning associated with their work, extending beyond mere economic goals and growth aspirations, though those were certainly present. The motivations for running these companies often include a social and community element. Some entrepreneurs began with the goal of affordable connectivity, while others initiated them as extensions of internet cafes or local area networks among friends for better gaming experiences. These varied usage scenarios influenced the emergence of these companies.

How would you characterise what 'Block Networks' reveals about technology and industry's effect on social and material relationships?

CC I feel there's a promise inherent in different forms of infrastructure and services. To me, the fascinating aspect is how these micro ISPs were organised on a small heterogenous scale yet coexisted, creating what appears as a patchwork of various, situated infrastructures converging at specific points. This challenges the notion of a uniform, single infrastructure. It fractures the infrastructure's promise into numerous smaller promises. This fragmentation is compelling. Brian Larkin discusses the poetics and politics of infrastructure, highlighting how infrastructure can also serve as a vehicle for promoting particular ideas of progress. In this context, because micro ISPs often originate from their own communities and modest intentions, they create more room for interpersonal relationships to thrive, in contrast to a more commercialised mode of interaction. As a result, their promises relate more to the groundwork of maintaining multi-infrastructural sites in the face of social and technical everyday struggles.

What was it like for you, a Romanian practitioner now based in the Netherlands, to work on a project in Romania?

CC Returning to Romania for this project was exciting. I've been interested in the micro-ISP phenomenon for a while, and this project allowed me to dive into the topic and connect with those who shared similar experiences and memories about the early days of the internet. Language played a role in making connections with people whose work is crucial to these developments.

It also served as a reminder of how language itself functions as an infrastructure. The ease of communication was notably influenced by our shared background, common understanding of specific terminology, humour, or even the absence of it. It played a significant role in our interactions.

1 Cristina Cochior, Julie Boschat-Thorez, Manetta Berends. 2021. 'From contradictionaries to formatterings: an introduction to VLTK—Vernacular Language Toolkit.' https://vltk.vvvvvvaria.org

From Re-enacting Redistribution to Working Class Heroes

ESSAY 26.08.2023 TEXT BY ALINA LUPU

The everyday experiences of a city's inhabitants are significantly influenced by the efforts of low-wage service industry employees, whose living conditions are not widely recognised. Investigating these conditions was what led artist Alina Lupu, first through an exploration of the minimum wage and universal basic income in Romania, and ultimately to speculating on the impact of automation on the social fabric of Timișoara. Born and raised in Romania, Lupu is a post-conceptual artist concerned with the conditions of participating in the economy and is based in Amsterdam. In this essay, she describes the process behind her work 'Working Class Hero'.

Disclaimer: *The project presented at* Turn Signals—Design is not a Dashboard*, titled 'Working Class Hero', was initially supposed to take a different turn (pun intended!) and address universal basic income, redistribution of wealth and ways of skipping economic development steps. But in the process of moving from planning to reality, from the realm of ideas to material reality, works tend to change—as they should. Still, I thought it would be insightful to also share what could have been, alongside what ended up being, in hopes of clarifying my thinking and demystifying the process. So strap in tight, and let's go.*

Development happens in parallel processes. It halts. It accelerates. Countries learn from each other. Although results cannot always be replicated across different cultures, it can still be helpful to look to those who have tried to tackle the same challenges as us, rather than starting from scratch. In some cases, developments in one profession or field can also be applied to others, even if they are governed by different principles. One such development, which has received a lot of attention in recent years, is universal basic income (UBI).

According to the Basic Income Earth Network, '[UBI] was first proposed at the local level by Thomas Spence at the end of the 18th century and at the national level by Joseph Charlier in the middle of the 19th. It was the subject of short-lived national debates in England around 1920 and in the United States around 1970. It resurfaced in Western Europe around 1980 and slowly spread until it gained worldwide popularity from 2016 onwards.'[1]

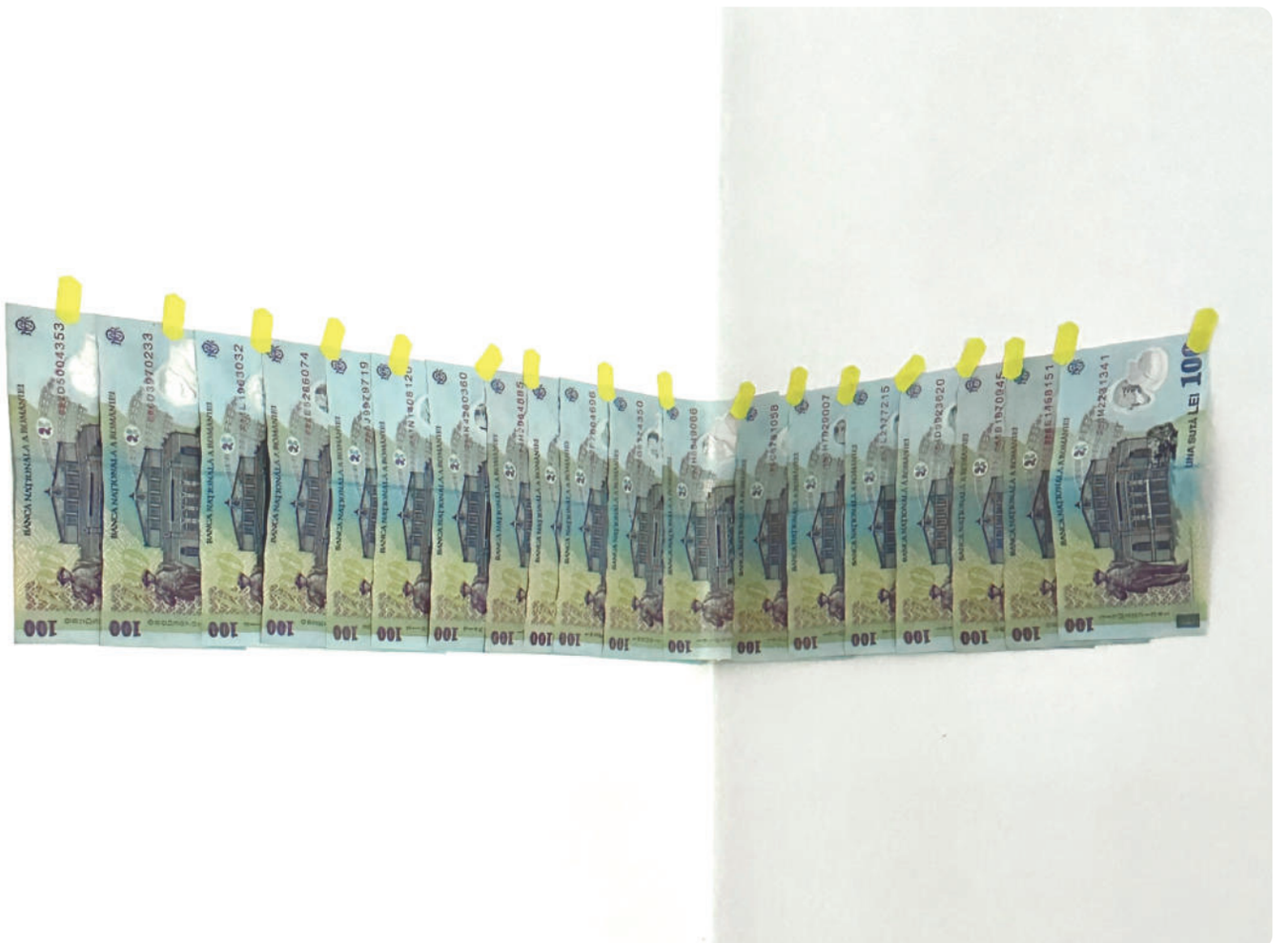
I'm a Romanian national, but I've been living and working in the Netherlands since 2012. As an artist whose field was subjected to budget cuts the year before I arrived in my adopted country, I've witnessed a UBI pilot but never participated in one, and the idea sparked my curiosity. I thought it would be a good topic to address in an exhibition focused on work.

In 2017, the Netherlands made global headlines when it piloted a UBI programme among 250 residents of Utrecht. The monthly amount participants received was 980 euros. At the time, this was just over 60% of the minimum wage for full-time employees aged 22 and over, which was 1,565.40 euros gross per month[2]. Enough to cover some basics, but too little to live a life of luxury.

When I started creating work for Bright Cityscapes, I used a report titled 'Economy in Timișoara: Territorial Distribution of the Economy in the Timișoara Metropolitan Area'[3] as my project's research foundation. But I also wanted to look beyond this report, which focused on employment and economy, as I was interested in not working, in unemployment, and in what people do if they don't fit the mould of industry, or labour in general. This led me to explore the concept of UBI. I already knew that Romania hadn't held UBI trials yet, but through my research I learned that a UBI Lab[4] was founded in Bucharest by Clara Sigheti in 2020, in the middle of the pandemic, with the goal of collecting findings from other European countries.

Travelling to Romania

Conditions in Romania differ from those in the Netherlands. The standard of living is lower in Romania, and the country has suffered a massive brain drain—not to mention a drain of a number of other organs,



Minimum wage from the ATM

metaphorically speaking. This has had a major impact on Romania's workforce over the past three decades, since it began its accelerated transition from communist dictatorship to capitalist democracy.

I see myself as part of this brain drain. I left at 27. But my motivation for leaving my country of birth had little to do with a search for better working conditions—as I noted earlier, despite the higher overall standard of living in the Netherlands compared to Romania, the field I ended up working in is one of extremes, where income levels had dropped significantly before I left my home country. In a neoliberal twist, the average artist's income in the Netherlands is similar to that of a shop clerk or cleaner[5], two jobs which happen to be common side gigs among artists.

So I didn't leave because I wanted to earn more—I left to develop other aspects of my potential. But the reality is that I left nonetheless. And for a while, I earned minimum wage in my adopted country. Incidentally, the minimum wage in the Netherlands is four times higher than in Romania.

In 2023, the minimum wage in Romania is 3,000 lei gross and 1,898 lei net.[6] This translates to 605.97 euros gross and 383.38 euros net. One thing to consider here is that the minimum needed to live a decent life in Romania is estimated at around 3,275 lei, or 661.57 euros. According to the report 'The Minimum Monthly Consumption Basket for a Decent Standard of Living for the Population of Romania', a family of two adults and one child requires a minimum household income of 7,112 lei per month. For a household made up of two adults without children, this is 5,322 lei, and a single adult needs 3,275 lei.[7]

It should be noted, however, that besides bare necessities such as food and shelter, things like clothing, personal hygiene, education, healthcare, transportation, communication, recreation were also taken into account in calculating the amounts mentioned above, as well as unforeseen expenses (family events, health problems, etc.). This not only accounts for the complexities of life beyond just sustaining oneself, but also considers the need for personal development.

The minimum wage after taxes in Romania is about 60% of the gross minimum wage, similar to the basic income that was piloted in the Netherlands. Hence, as a minimum wage-earning artist, I was curious about what it means to earn minimum wage in one's own country, as well as about what it would mean if this minimum would be covered by the state, leaving people free to fill their time as they see fit as their basic needs would be covered.

It became obvious to me that if UBI were to be tested and implemented in Romania, it could help prevent both brain drain and the spread of poverty. As Clara Sigheti,

the initiator of the Bucharest UBI Lab, explained in an interview: 'UBI assumes that the state periodically grants an amount of money to each citizen, an amount that covers basic needs, for a dignified life.'[8] Sigheti also noted the challenges the labour market is currently facing, which will only accelerate in the future:

> We have already discussed how automation will affect the labour market, but there are many other issues, from my point of view, that are even more pressing: the refugee crisis and the crisis of economic migration to countries with more developed social protection systems, peacekeeping and deterrence of terrorism, child poverty and its impact on education, the recognition of the unpaid work that many women do and women's rights, the prevention of domestic violence and child abuse, the prevalence of crime, addiction, and physical and mental health problems in disadvantaged environments, economic inequity, and inequality of opportunity. But we also need to support innovation and encourage entrepreneurship. While UBI could help in all these areas, it seems a bit cynical to frame the issue only in terms of the advantages it would bring us. The way I see things, we need UBI because we live in a society that we have developed to the point where we have the technology and resources to cover basic needs if we organise ourselves well enough.[9]

I therefore thought it would make sense to set up a tiny UBI trial within the *Turn Signals* exhibition framework, building on some of my previous projects, such as 'Who Says There's No Money in the Arts, Timeline'[10] and 'Subtle Schemes to Derail Funds but by No Means Structural Solutions'[11], which dealt with new economic models, system hacking and redistribution.

As a result, my project proposal for *Turn Signals—Design is not a Dashboard* ended up being a fully conceptual framework that read something like this:

> Find (up to) five people that live on minimum wage in Timișoara and record video interviews with them about how they currently live their lives and how they would like to live their lives if they had a guaranteed basic income. For their contribution to the project, participants would be paid approximately 60% of the minimum wage for a month. This experiment aims to both enact redistribution and reflects on how minimum wage currently functions, outside of the abstracted mechanisms set out in the report that Bright Cityscapes commissioned, entitled 'Economy in Timișoara: Territorial Distribution of the Economy in the Timișoara Metropolitan Area'.

But when the time came to drag my idea into the world of the living, which meant finding people who earned minimum wage—the very first step in the process—there were some limitations. The people who were interviewed for the economic report that the exhibition commissioned did not earn minimum wage, or so I was told. The researchers who wrote the report had not made detailed inquiries about the interview subjects' salaries, as this information is confidential in Romania.

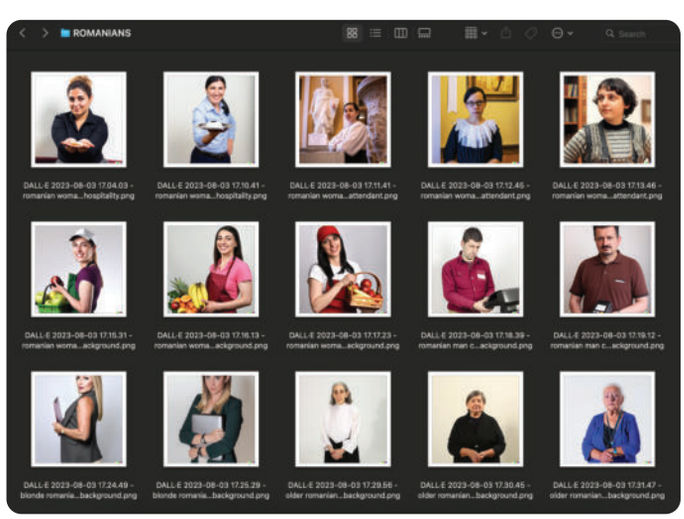
So I studied other reports on minimum wage in Romania to identify professions that could lead me to the people I was looking for, including 'Salariu minim și trăi minim decent – de la mituri la oportunități',[12] which was published in 2021, and a governmental impact study entitled 'ANALIZA IMPACTULUI – privind salariul minim brut garantat în plată pentru anul 2020'.[13]

There were also individual assumptions. Some of the people I talked to assumed others earned minimum wage due to their preconceptions about certain professions.

I decided to do field research, travelling from Amsterdam to Timișoara a month before the opening of the exhibition and going out into the streets. But the first step I took was a symbolic one: I found a cash machine, withdrew the minimum wage in Romania in cash, and brought it back to my hotel room. It was the first thing I looked at when I woke up and the last thing I saw before going to sleep.

With this image imprinted on my retina, I went around the city during business hours to talk to workers. I encountered a lot of reluctance. The people I spoke to weren't reluctant to get paid, mind you, but they were hesitant to talk to me off the clock, particularly for a project. Money was scarce for them, and they felt it was a topic better left undiscussed. Still, the fantasy of escaping, of moving somewhere else where money would be more plentiful, always hovered over the conversations I had.

I talked to waitresses, cashiers, public workers, security guards, museum guides, and a self-employed entrepreneur. When asked what they would do if money weren't an issue, most of the people I spoke to seemed to want to simply reproduce their working format and impose it on others. I found this puzzling, but also understandable. After a number of these conversations, I decided to change direction and give up on the idea of redistribution—of a UBI trial—involving the people I had interviewed. Instead, I considered what it would mean if their jobs were to disappear as a result of automation.



Variations of Romanian workers. AI-generated

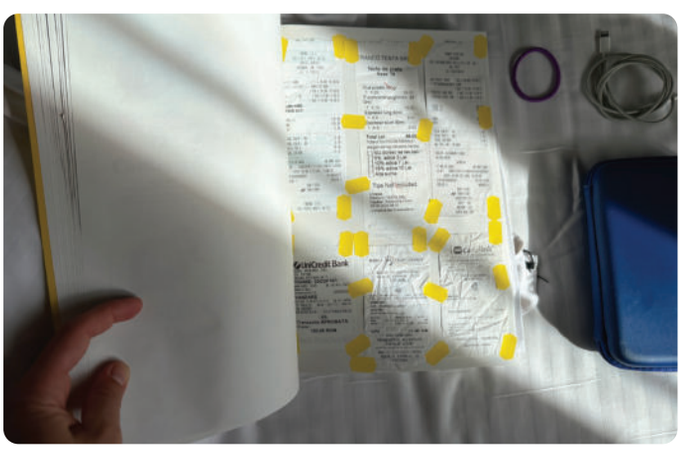
What would the city be like without its waitresses, cashiers, public workers, security guards, museum guides, and self-employed entrepreneurs, I wondered as I fed their words into my Notes app and Grammarly. I then asked DALL-E to generate variations of 'Romanian waiter woman neutral background' and brought these newly crafted characters to life using D-ID. What would it mean if I, the one reflecting on their positions, also ended up being automated in the process?

This brought me back to a recent tweet on the topic of automation: 'ZIZEK: that AI will be the death of learning & so on; to this, I say NO! My student brings me their essay, which has been written by AI, & I plug it into my grading AI, & we are free! While the 'learning' happens, our superego is satisfied, we are free now to learn whatever we want'.[14]

I mentally replaced 'learning' with 'working', but then I had to remind myself, by listening to the interviews I had conducted, that for a lot of my subjects their work was intertwined with their identity. You don't just take orders and serve food, sell tickets or guide visitors, or deal with work regulations or craft concepts—you are each of these actions while performing them. To change what you do is therefore to change your identity, and this requires more than just the money needed to cover basic expenses. Workers would have to learn what else they could do with their time that would give them a sense of identity, and this would involve a much bigger learning process to liberate their human potential.

Within the confines of my project, money did end up being redistributed: through small purchases I made during my stay in Timișoara, for which I saved my receipts, through tips, through the design work I commissioned for the exhibition, and through the DALL-E credits and D-ID subscription I bought. Part of the money went towards international automation companies, part of it was spent locally, and some of it went to the Romanian state. Nevertheless, the true re-enacting of redistribution within the confines of a small UBI trial never happened.

Widespread implementation of UBI programmes may still be a long way off, but I can't help but think that this is an idea, a development step, that Timișoara should take the lead in.



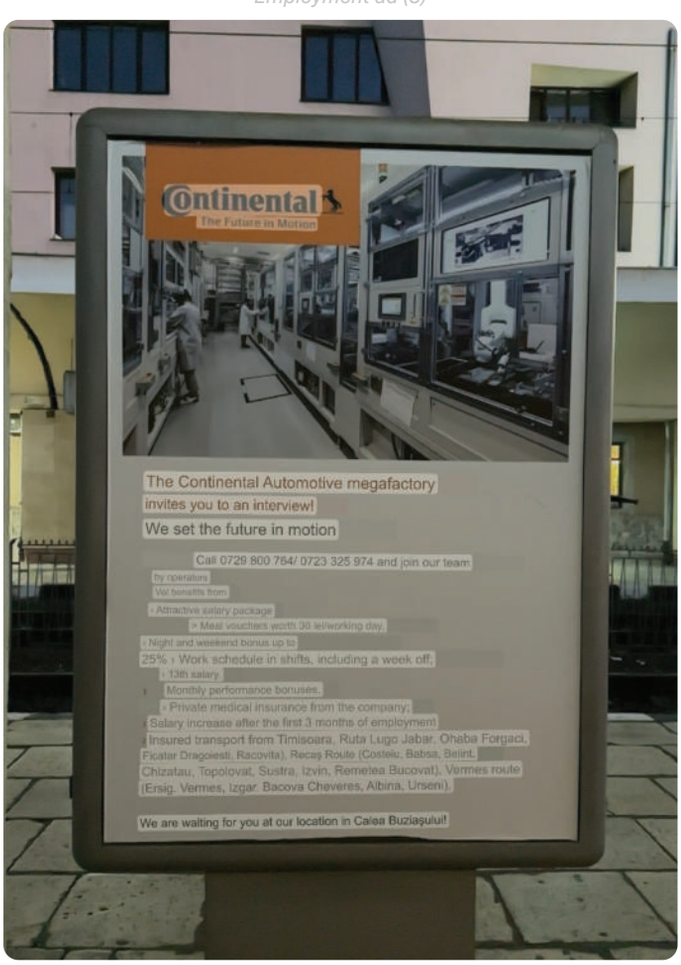
Index of Receipts

Employment office, Timișoara

Employment ad (1)

Employment ad (2)

Employment ad (3)



Employment ad (4)

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13 Government of Romania, 2019. 'Impact Analysis Regarding the Guaranteed Minimum Gross Salary in Payment for the Year 2020.' https://media.hotnews.ro/media_server1/document-2019-11-26-23514925-0-analiza-impact-salariul-minim.pdf
14 Zack Brown. 2022. "ZIZEK: that AI will be the death of learning & so on; to this, I say NO! My student brings me their essay, which has been written by AI, & I plug it into my grading AI, & we are free! While the 'learning' happens, our superego satisfied, we are free now to learn whatever we want." Twitter, December 7, 2022. https://twitter.com/LuminanceBloom/status/1600598003391266816

Photographic documentation by Alina Lupu

6. Turn Signals—Design is not a Dashboard

Turn Signals—Design is not a Dashboard

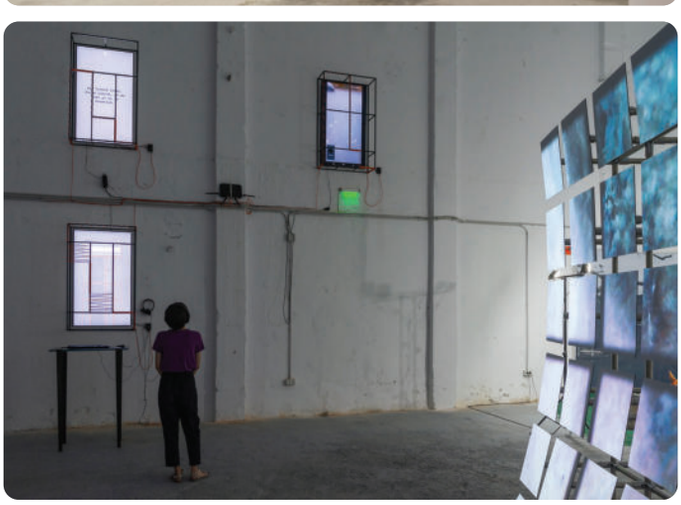
EXHIBITION 07.09.2023–11.11.2023

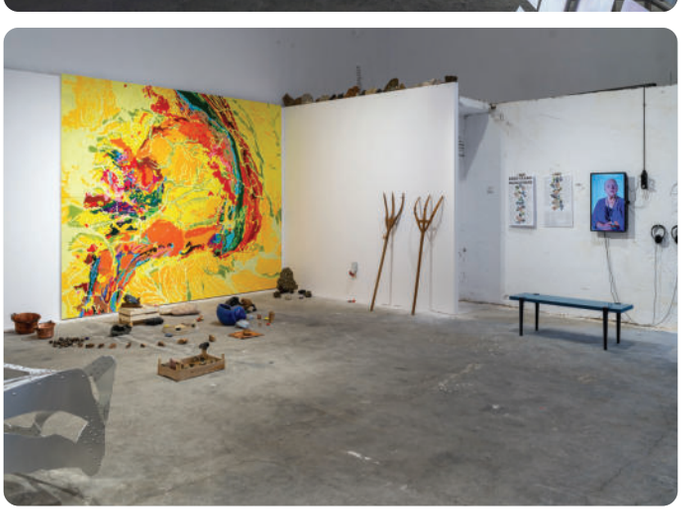
Since Romania joined the European Union, its manufacturing sector has experienced substantial growth. Simultaneously, the global manufacturing landscape is undergoing a profound transformation due to rapid digitalisation and the integration of global supply chains, making innovation a paramount necessity for the country. This expertise is evident throughout Timișoara, in its industrial parks, specialised labour market, and technical universities. Interconnected networks of knowledge, resources, and values not only facilitate multinational corporations, city developments, and academic laboratories but also continue to honour the city's engineering legacy. However, the potential of design often remains untapped and concealed within academic research networks, corporate intellectual property, mechanical components, sophisticated technological objects, and profit-driven logics.

Turn Signals—Design Is Not A Dashboard is an exhibition that explores how design can act as a conduit for collaborative ventures that go beyond the confines of established manufacturing parameters. Anchored within the contextual framework provided by a commissioned report, 'Economy in Timișoara: Territorial Distribution of the Economy in the Timișoara Metropolitan Area', the exhibition invited multidisciplinary practitioners to collaborate with local researchers, interpreting the statistical data through the designed lenses of devices, bodies, agents, media, forces, and networks. These collaborations drew from existing research, leveraged the local engineering network, and engaged with well-established knowledge systems within and beyond Timișoara's industrial ecosystem. The resulting projects converge at the crossroads of information asymmetries across disciplines, supply chain stages, computational processes, the collective imagination, material cultures, and the expansive manufactured environment. By observing and reinterpreting the navigational pathways of these asymmetries, these projects signal the presence, concealment, and imminent transformation of design within Timișoara.

The exhibition's title draws inspiration from an indispensable everyday object produced in local and multinational automotive plants in Timișoara—the turn signal indicators on vehicles, used to communicate directional shifts to fellow drivers. These indicators, enmeshed within the intricacies of engineering processes and nestled onto dashboards, exemplify the potential for design to be limited to mechanical refinement and obscured by technological complexities. By exceeding the confines of a mere dashboard, the design practices and discourses in the exhibition have explored the city's products and resources from local and global perspectives, connecting places, people, and urgencies across different scales. The exhibition serves as a turn signal to Timișoara, inviting a new trajectory for the city's design, architecture, and digital culture.

Different media, storytelling formats, and design languages are used to explore both the hidden narratives and untapped resources within Timișoara, and how design can intersect with and question topics related to industry more generally. By dislocating the expected media and aesthetics of how the city is represented, the exhibition tells compelling stories that invite different ways of seeing, expanding imaginative possibilities.





Curator
Martina Muzi

Exhibition team
Bianca Schick (assistant curator and animated visuals)
Federico Santarini (data visualisations)
Alex Foradori (animated visuals)

Participating designers
Théophile Blandet
Cinzia Bongino
Cristina Cochior
Jing He
Flora Lechner
Guillemette Legrand
Alina Lupu
Petre Mogoș and Laura Naum / Kajet Journal
Simone C Niquille /technoflesh
Parasite 2.0
Santiago Reyes Villaveces

UPT researchers
Versavia Ancușa
Ioan Both
Raul Ionel
Cristina-Sorina Stângaciu

Research team
Norbert Petrovici (coordination)
Vlad Alexe (data science)
Vlad Bejinariu (history)
Ágota Ábrán (organisational ethnography)
Andrei Herța (organisational ethnography)
Macrina Moldovan (organisational ethnography)

Graphic identity and digital platform
Kirsten Spruit

General coordination team
Oana Simionescu (FABER)
Loredana Gaiță (UPT)

Exhibition production team
Lorena Brează
Sandro Damian
Nicușor Duma
Mihai Moldovan

Editors
Nadine Botha (EN)
Cristina Potra Mureșan (RO)

Mediation team
Mihaela Tilincă
Claudia Bucsai

Mediation program graphic design
Flavia Țună

Communication team
Ema Prisca
Victoria Cociotă
Diana Caducenco

Photographers
Seba Tătatu
Alexandru Todirică

Collaborators
Azur, Flex, FOR, Hamilton Central Europe (especially with the support of the Mechanics, Metal Sheet Processing, Laboratory and R&D departments), Inside Manufacture, Institutul Prezentului, Isho, Studio Citadelle

A Lexicon of Orientation

Data story-telling and visualisations,
AI-generated visuals and glossaries

LEXICON 07.09.2023

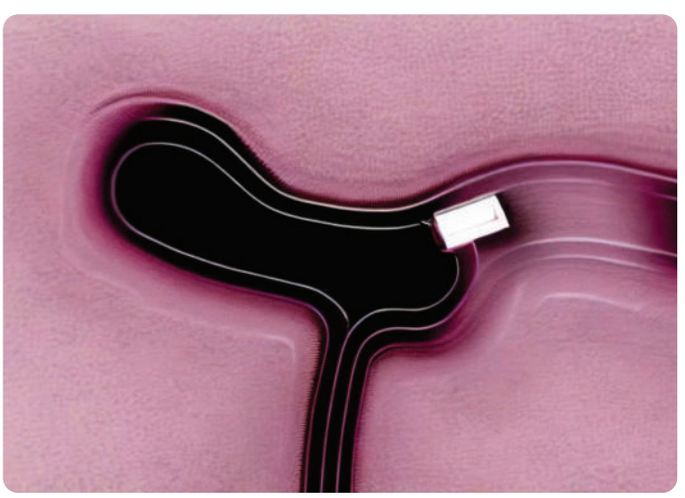
‘A Lexicon of Orientation’ is a set of visual and linguistic vocabularies that articulate Timișoara’s economy and geography. Drawing on a commissioned report, ‘Economy in Timișoara: Territorial Distribution of the Economy in the Timișoara Metropolitan Area’, the lexicon identified five pivotal subjects: Industrialisation and Technological Level, Workers, Commuting and Internal Migration, Import and Export, Automotive and Related Industries, and Outsourcing and IT.

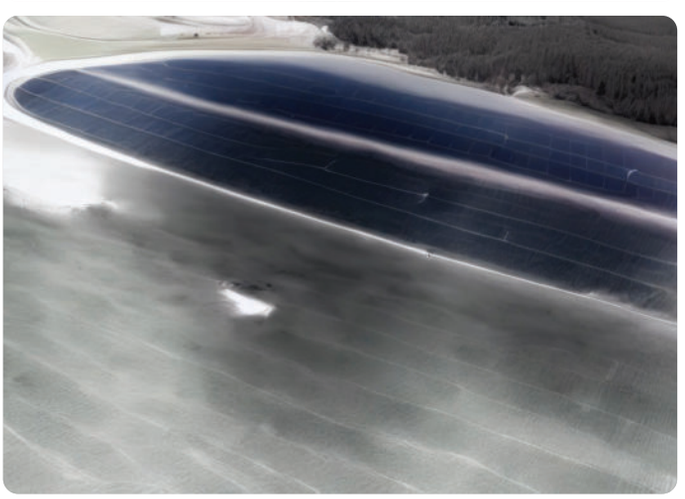
These subjects have informed the creation of five glossaries, five data visualisations, and five AI-generated visuals. Through these distinct analytical, semantic, and visual representations, ‘A Lexicon of Orientation’ serves to connect shared concepts, index complex phenomena, and establish a semantic foundation for collaboration across information asymmetries between disciplines, industries, and audiences.

For the data visualisations, original data from the report was used to develop a detailed narrative for each main theme. This involved investigating distinct phenomena within the data, constructing precise timelines to trace the sequence of events, and unpacking the intricate relationships and linkages between various data points.

Although the glossary’s terms and their explanations are not exhaustive or definitive, they shed light on the nuances of evolving processes, temporal-spatial dynamics, standards, infrastructures, models, and their socio-economic consequences. These terms also served as the prompts for the animated films generated by AI using multimodal neural networks, Stable Diffusion Web UI and Gen-2. By transforming both text prompts and visual inputs into moving images, five fictional landscapes have been created.

Within the *Turn Signals—Design is not a Dashboard* exhibition, ‘A Lexicon of Orientation’ serves to provide an interpretative narrative of the ‘Economy in Timișoara: Territorial Distribution of the Economy in the Timișoara Metropolitan Area’ report, which directly and indirectly informed each of the designers’ showcased works. Through the multiplicity of vocabularies, the lexicon refrains from offering an absolute representation of the report, re-emphasising that design and data are always subject to interpretation and application beyond mere market-based optimisation.





Credits
Co-edited with the assistance of OpenAI’s ChatGPT
Curator: Martina Muzi
Assistant curator and AI-generated visuals: Bianca Schick
Data story-telling and visualisations: Federico Santarini
AI-generated visuals and editing: Alex Foradori

Data Sources
Petrovici, Alexe, Bejinariu, 2023. ‘ Economy in Timișoara: Territorial Distribution of the Economy in the Timișoara Metropolitan Area’, 2023

A Lexicon of Orientation: Automotive and Related Industries

LEXICON 07.09.2023

DATA VISUALISATION

Subject: Automotive and Related Industries
Location: Timișoara and Timiș County, Romania

An analysis of the automotive sector in Timișoara and Timiș County, highlighting the growth in employee numbers in the industry. The visualisation explores the industries in Timișoara that are integral to the automotive supply chain and presents an overview of the network of industries associated with car production.

INSIGHTS BY SOCIOLOGIST NORBERT PETROVICI

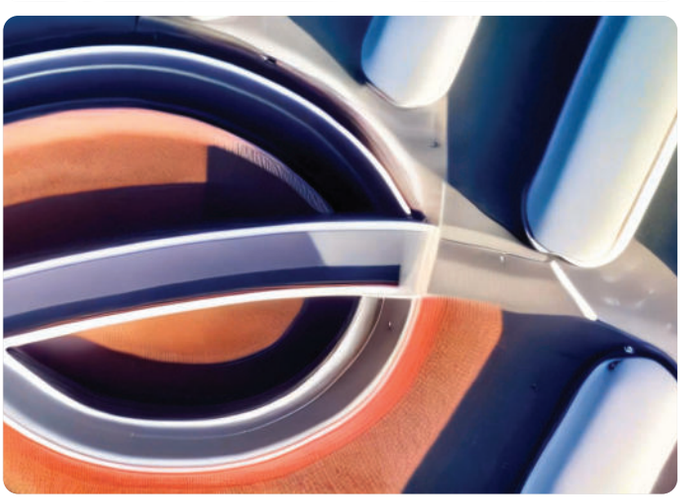
Timișoara Automotive Industry: A Global Driver
In Timișoara, the automotive industry stands as the main economic driver, with sectors such as chemical and electronics serving as integral components, either as direct suppliers or indirectly associated entities in the global market. This interconnection has positioned Timișoara as an important node in both the national and global automotive supply chains.

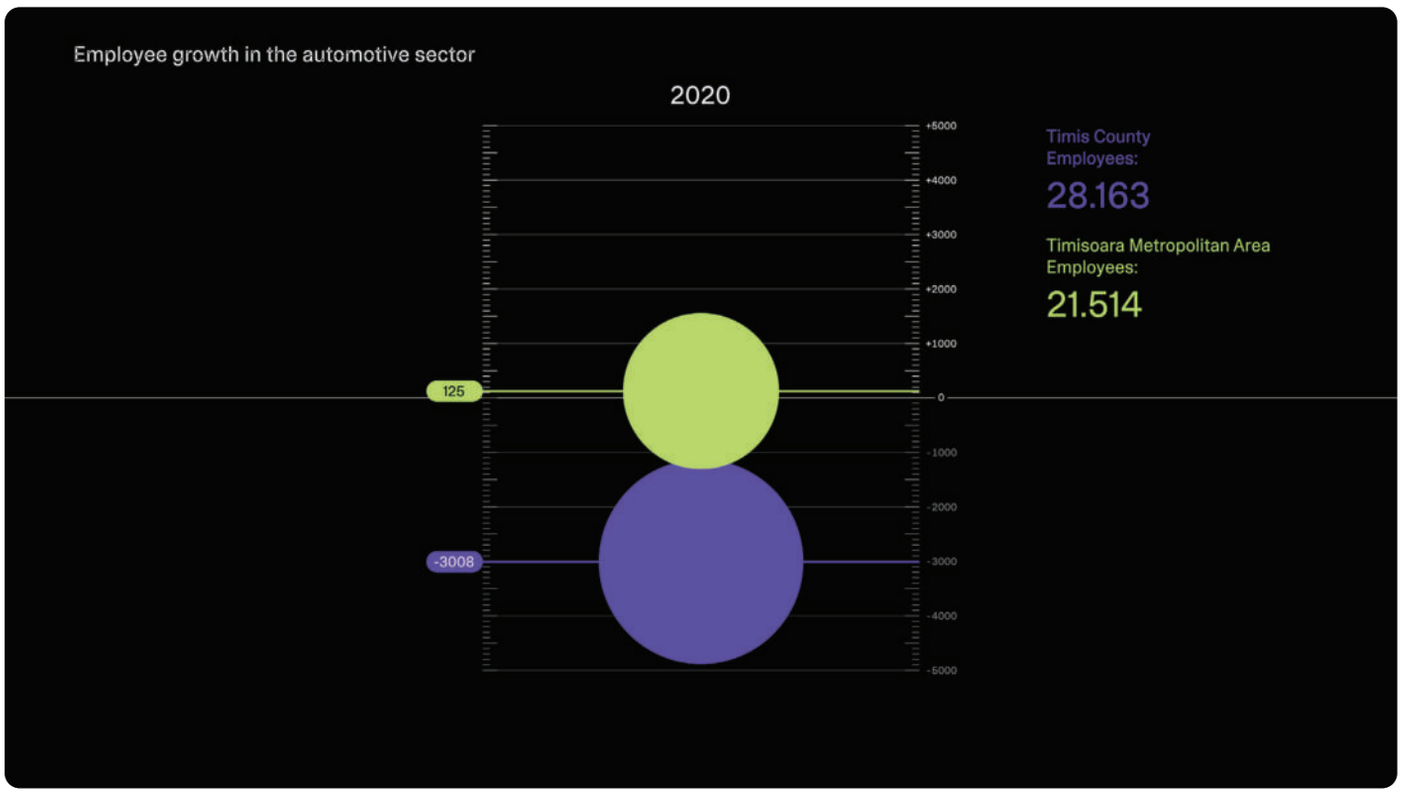
Privatisation Transformations and Strategic Benefits
The economic landscape of the region experienced considerable transformations through various privatisation initiatives. Among these, the successful privatisation of Dacia/Renault during Romania's EU pre-accession negotiations is of particular importance. This privatisation had a particularly positive impact on Timișoara as it maintained the national supply chain, including the chemical, electrical, and electronics sectors. This strategic move enabled companies based in Timișoara, including Elba, a key player in the lighting industry, to expand internationally while continuing their service to Dacia. Additionally, engineering service providers like Continental and Bosch relocated to Timișoara, offering their expertise and contributing to the growing complexity of the supply chain within the national economy.

Timiscara's Skilled Workforce in the Automotive Sector
These progressions have resulted in a significant portion of Timișoara's workforce, including over 25 000 engineers, either directly or indirectly involved in the dominant industrial sector. This achievement was made possible through the employment of available human resources and efficient infrastructure developed during the 1970s and 1980s.

AI-GENERATED VISUALS

./prompt: the, automobile, industry, marked, by, rapid, evolution, embraces, technological, innovation, Foreign Direct Investment (FDI), fosters, global, collaboration, promoting, expansion, and, diversification, while, lean manufacturing, and, the, Just-in-Time (JIT) model, optimises, speed, and, standardisation, real-time systems, ensure, rapid, responsiveness, to, changes, and, demands, steel, aluminum, plastics, rubber, magnesium, and, glass, undergo, repeated, manufacturing, processes, creating, precise, components, as, the, industry, shapes, urban infrastructure, a, transformation, unfolds, optimising, road networks, parking, and, traffic, control, bridges, tunnels, and, EV, charging, stations, support, efficient, transport, as, repetition, and, noise, resonate, within, the, landscape, standardisation, and, reproducibility, drive, assembly line, mass production, and, mass distribution, emphasising, large-scale, efficiency, through, automation, syncronisation, and, optimisation, the, industry, maintains, a, consistent, and, efficient, production, flow





Employee growth in the automotive sector. Comparative employee growth in the automotive sector from the previous year: Timiș County reveals a marked decline in workforce numbers, while Timișoara and its metropolitan areas experience a subtler decline. (Still from animated data visualisation)

Automotive supply chain. The automobile is a prime example of a very complex product, integrating a vast array of components procured from various sectors. This supply chain merges suppliers, manufacturers, and logistics, with each playing a crucial role in maintaining the flow of parts and materials, ensuring the assembly of the final product. (Still from animated data visualisation)

GLOSSARY

A

Andon
A visual management tool that signals production issues to operators.

Assembly Line
A sequential production process in which parts are added to a product in a sequential manner.

Automation
The use of machinery, robotics, and computerised systems to perform manufacturing tasks with minimal human intervention.

Automotive Cluster
A group of interconnected companies and institutions from the automotive sector, located near each other.

B

Batch Production
Production method where products are produced in groups or batches and not in a continuous stream.

Break-Even
The volume of goods or services that must be sold for the business to make neither a loss nor a profit.

Bottleneck
A point of congestion or blockage in a production process.

C

Commodity
A standardised good, often raw material, that can be bought and sold interchangeably with goods of the same type.

Continuous Improvement
The ongoing effort to improve products, services, or processes.

Continuous Manufacturing
A method used to produce products continuously rather than in batches.

Cycle Time
The time taken to complete one cycle of an operation.

D

Demand-Driven Production
Production based on actual demand rather than forecasts.

Downtime
The time during which a machine or factory is not operational.

Driverless Car
A vehicle that uses a combination of sensors, cameras, radar, and artificial intelligence to travel between destinations without a human operator.

F

Failure Mode and Effects Analysis (FMEA)
A step-by-step approach for identifying all possible failures in a design, manufacturing process, or product.

Fordism
A system of industrial production designed for mass production and influenced by the methods pioneered by Henry Ford.

G

GDP (Gross Domestic Product)
The total value of goods and services produced within a country's borders in a specific time frame.

Global Value Chain
Activities conducted to bring a product from conception to end-use.

I

Industrial Internet Of Things (IIoT)
The application of IoT in industrial settings, emphasising machine-to-machine communication, big data, and machine learning.

Internet of Things (IoT)
The network of interconnected physical devices that communicate and exchange data with each other through the internet.

Inventory Management
Supervising non-capitalised assets or stock items.

ISO 9001
An international standard for a quality management system.

J

Jidoka
Automation with a human touch, allowing machines to work autonomously with human supervision.

Just-In-Time (JIT)
A management strategy to decrease waste by receiving goods only when needed in the production process.

K

Kaizen
A Japanese term meaning 'change for better', referring to continuous improvement.

KPI (Key Performance Indicator)
A measurable value that demonstrates how effectively a company is achieving key objectives.

L

Lead Time
The time between the initiation and completion of a production process.

Lean Manufacturing
A systematic method for waste minimisation without sacrificing productivity.

Lemons
In American slang, a lemon is a car that is found to be defective after it has been bought.

M

Machining
A process in which a piece of raw material is cut into a desired final shape and size by a controlled material-removal process.

Mass Customisation
Mass customisation refers to a business process of providing customised goods and services that best meet individual customer's needs.

Mass Production
Large-scale manufacturing of standardised products.

Material Science
The study of materials used in automotive manufacturing, focusing on their properties, behaviour, and application to improve performance and safety.

Mean Time Between Failures (MTBF)
The predicted elapsed time between inherent failures of a mechanical or electronic system during normal system operation.

Mobility as a Service (MaaS)
A shift away from personally-owned modes of transportation and towards mobility solutions consumed as a service.

Multi-Process Operation System
An advanced manufacturing system that handles multiple processes.

O

Overshoot
Exceeding a target in production or other processes.

P

Poka-Yoke
A mechanism to prevent mistakes in the manufacturing process.

Prototyping
Creating a preliminary model from which other forms are developed or copied.

Q

Quality Assurance
A system of activities, including quality control, that ensures products or services meet customer requirements.

Quality Control
The process of ensuring products or services meet specific quality standards, with focus on defect prevention.

Quality Management System (QMS)
A formal system detailing the tasks and responsibilities for achieving quality policies and objectives.

R

Raw Material Sourcing
The process of procuring the fundamental components needed for manufacturing or production.

Real-Time Systems
Systems that must provide an output or response within a specified time period, often in the order of milliseconds or even microseconds.

S

Single-Minute Exchange of Die (SMED)
A system for dramatically reducing the time it takes to complete equipment changeovers.

Six Sigma
A set of techniques and tools for process improvement.

Standard Operating Procedure (SOP)
An established procedure to be followed in carrying out a given operation or in a given situation.

Supplier Development
The process of working with certain suppliers on a one-to-one basis to improve their performance for the benefit of the buying organisation.

Supply Chain Management
Managing the flow of goods and services, including all processes that transform raw materials into final products.

T

Taylorism
The science of dividing specific tasks to allow employees to complete assignments as efficiently as possible, first developed by Frederick Taylor.

Throughput
The rate at which a system produces products.

Tolerance
The permissible limit or limits of variation in a physical dimension.

Tooling
The process of equipping a factory with machinery and tools for a particular manufacturing process.

Traffic Signal Optimisation
Methods to implement the best possible timing settings that govern the operation of a traffic signal.

Turn Signals
Direction indicator lights mounted near the left and right front and rear corners of a vehicle, and sometimes on the sides of a vehicle.

Turnover
The total revenue generated by a business over a specified period.

U

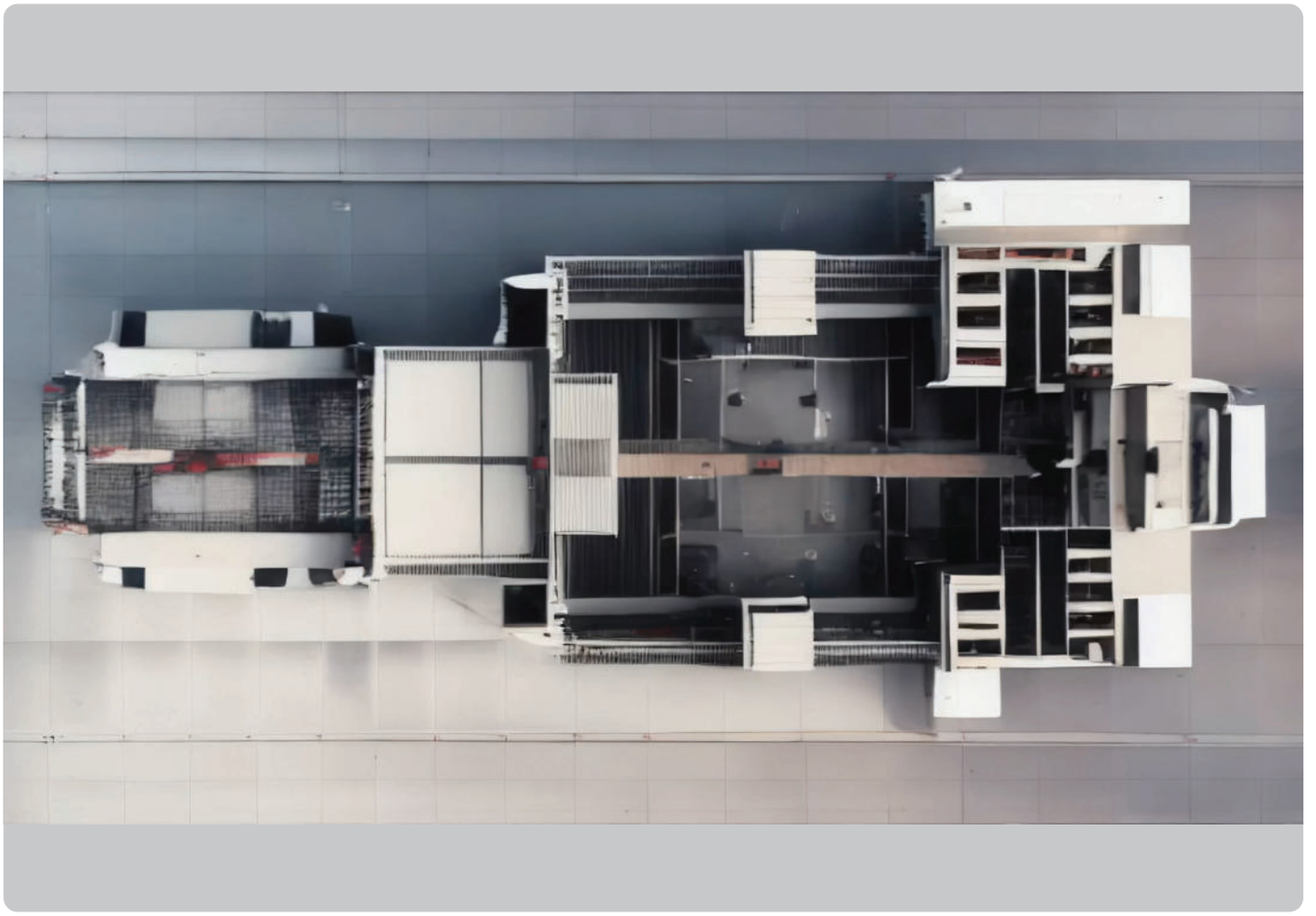
Urban Infrastructure
Components like roads, parking facilities, and intelligent transportation systems essential for the functioning of automotive ecosystems in urban settings.

V

Value-Stream Mapping
A visual tool that employs a flowchart documenting every step in the process to reduce waste.

Z

Zero Inventory System
A system aiming to reduce held stock to an absolute minimum.

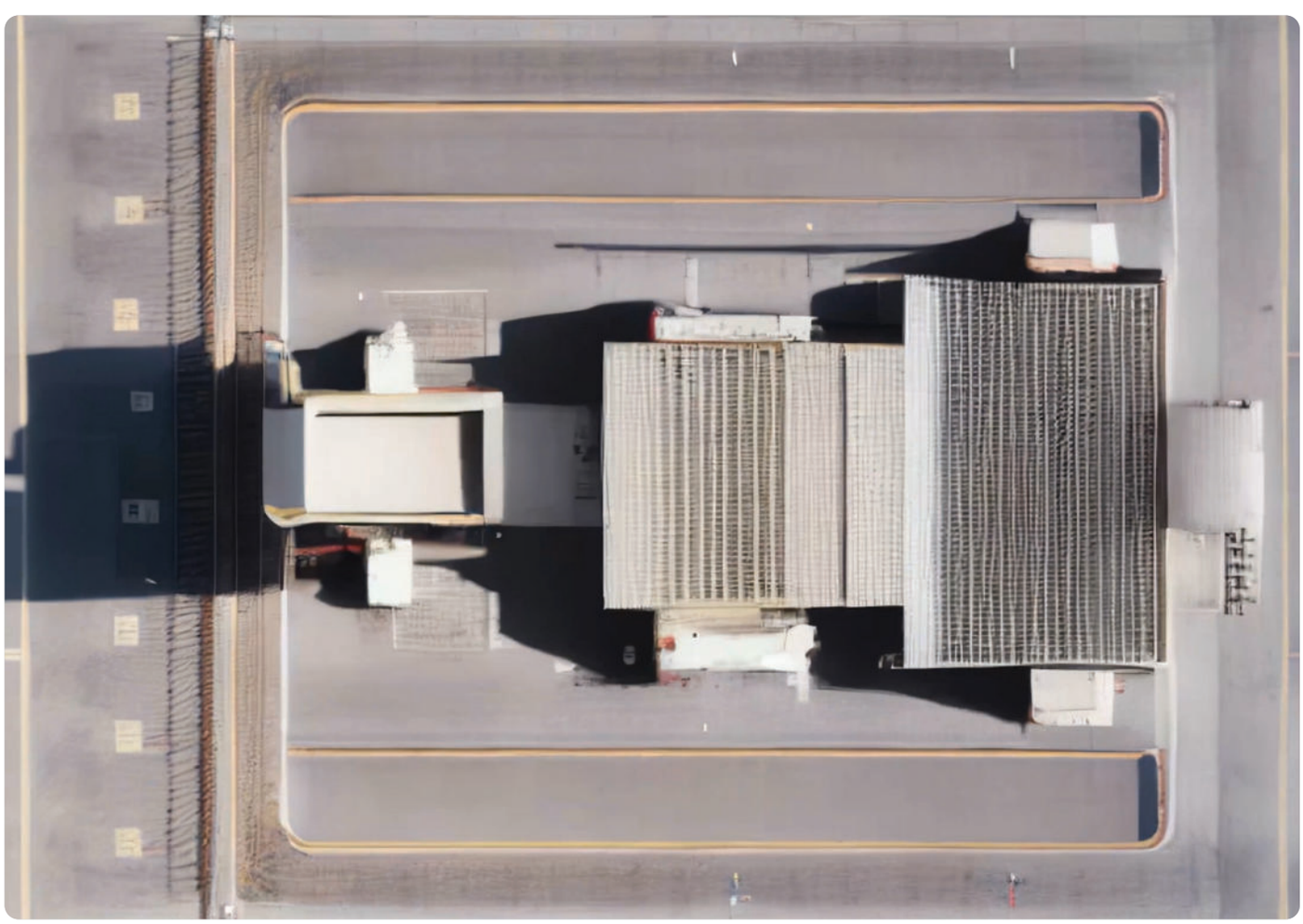


Credits
Data visualisations: Federico Santarini
AI-generated visuals: Bianca Schink, Alex Foradori

Data Sources
Petrovici, Alexe, Bejinariu, 2023. ‘Economy in Timișoara: Territorial Distribution of the Economy in the Timișoara Metropolitan Area’
The Growth Lab at Harvard University. The Atlas of Economic Complexity: Romania’s Product Space, 2020

A Lexicon of Orientation: Import and Export

LEXICON 07.09.2023



DATA VISUALISATION

Subject: Import and Export
Location: Romania

An overview of Romania's export growth between 1995 and 2020, paired with insights into the primary export destinations for seven key products, including car lights, car seats, rubber tires, refined copper, PCB boards, electrical insulated wire, and epoxy resins.

INSIGHTS BY SOCIOLOGIST NORBERT PETROVICI

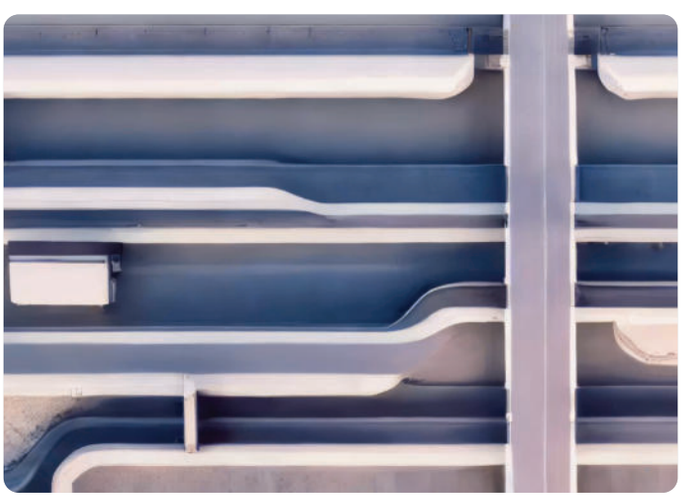
Romania's Export-Driven Transformation
From the 1990s onwards, Romania underwent a significant economic transformation. Initially characterised by slow growth, due to internal consumption from both the government and the population, the country underwent substantial changes after the 2008 economic crisis. This transformation was accelerated by its entry into the EU in 2007 and gained momentum in 2011. During this time, Romania redirected its attention towards exports, prompting cities like Timișoara to transform into global, market-oriented entities with a strong capability for industrial exports.

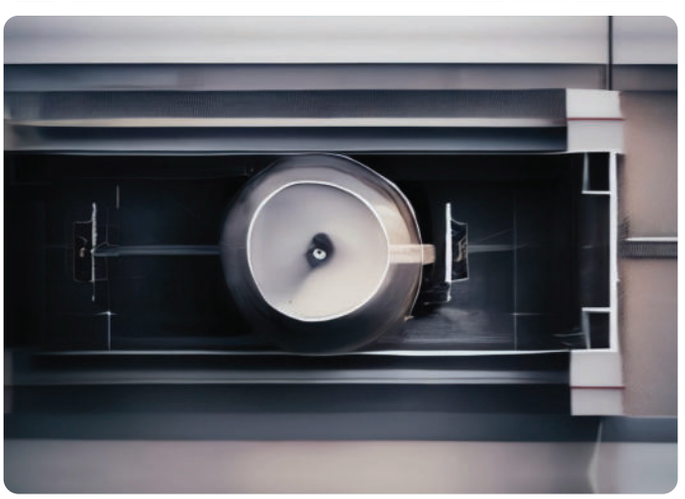
The Complexity of Timișoara's Economic Growth
The economic expansion of Timișoara is remarkable for its diversification into services, encompassing engineering and software production in Shared Service Centers. However, this diversification frequently goes overlooked in economic categorisations. Numerous FDI companies in Timișoara identify themselves as industrial due to their dual functions—of industrial manufacturing and service delivery—to manufacturing processes. This starkly contrasts with cities like Cluj, where different companies are primarily involved in software production, leading to their prominent categorisation in the IT sector. In Timișoara, the IT sector is interwoven with engineering services, predominantly supplied in-house to FDI industrial conglomerates.

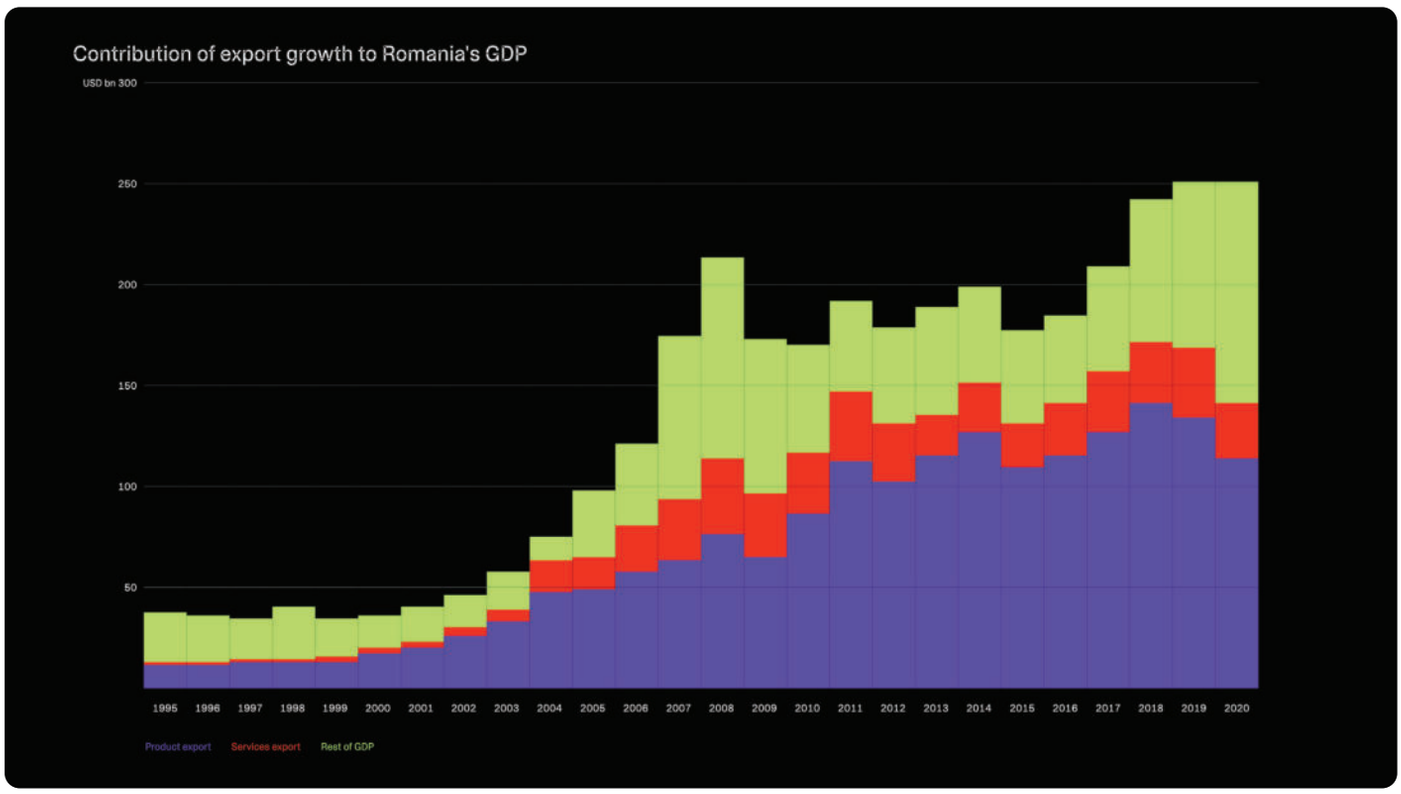
Import-Export Dynamics and Romania's Automotive Role
The economic growth of Romania is significantly shaped by its import and export dynamics. A considerable portion of imports consists of intermediate goods, often semi-finished products that are completed locally and then exported. While officially classified under various sectors, these products are predominantly used in the automotive industry, highlighting Romania's key role within the continental supply chains. Timișoara is pivotal in this regard, making significant contributions to the automotive supply chain and thereby enhancing the prominence of the automotive sector within Romania's export portfolio.

AI-GENERATED VISUALS

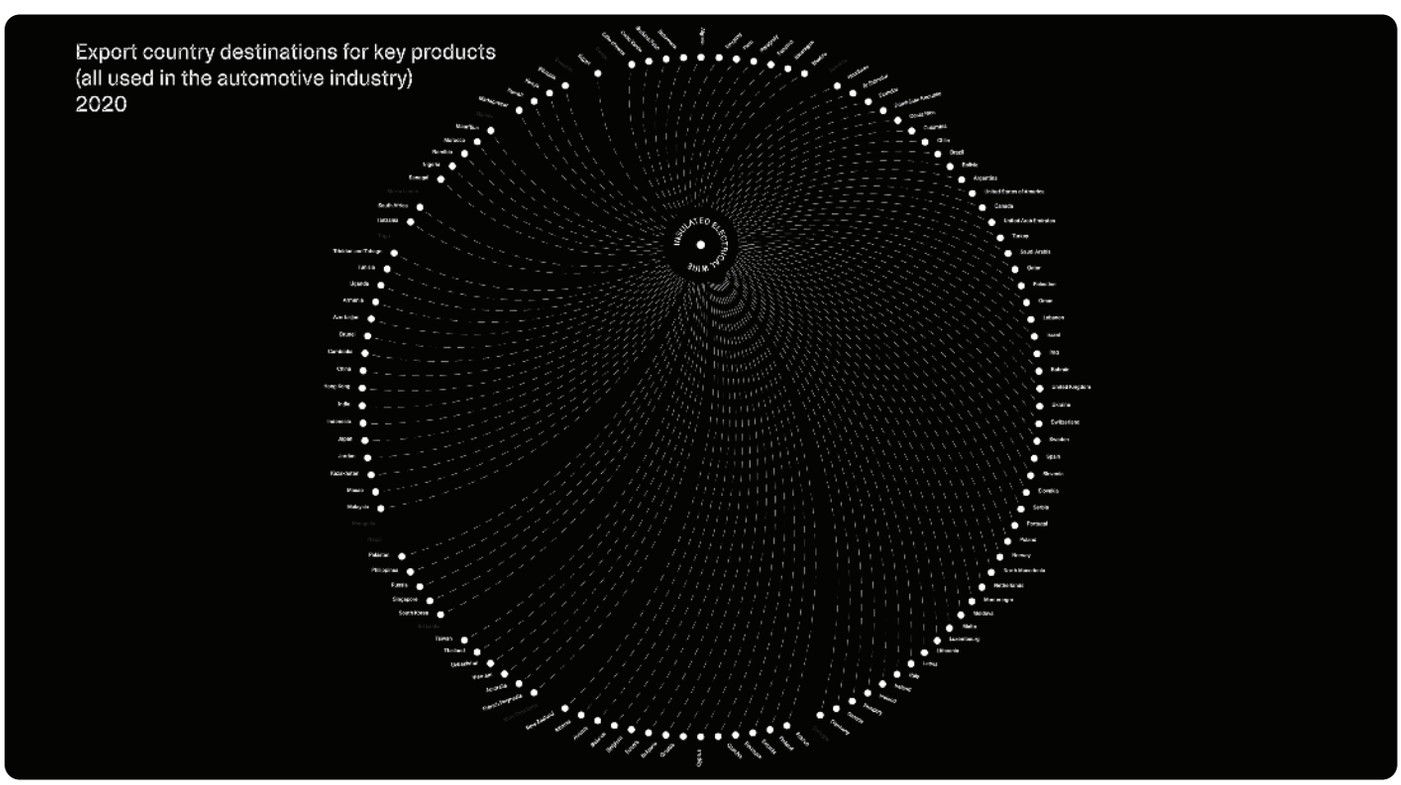
./prompt: in, global, commerce, logistics, hubs, and, port, facilities, form, the, foundation, of, trade, routes, dictating, the, rhythm, of, international, exchanges, guided, by, INCOterms, transactions, receive, validation, through, bills of lading, while, freight forwarders, and, multimodal transport, ensure, streamlined, coordination, containerisation, optimises, transport, and, as, products, return, or, deviate, reverse logistics, manages, their, trajectory, practices, such, as, global sourcing, exploit, international, diversities, while, digital twin supply chains, envision, real-time, scenarios, for, optimal, decision-making, demand forecasting, anticipates, market, needs, and, the, intricate, global value chain, seamlessly, integrates, products, such, as, rubber, PCBs, and, refined, copper, economies of scale, come, into, play, maximising, efficiency, and, profits, while, policy-driven, aspects, like, import tariffs, and, free trade zones, shape, economic dynamics, all, integrated, in, the, vast, network, of, supply, and, demand







Romania's export sector showcases significant growth over the years, marked by a consistent increase in exports as a percentage of GDP. (Still from animated data visualisation)



Destination countries for car lights exported from Romania. (Still from animated data visualisation)

GLOSSARY

A

Absolute Advantage
When a country or company can produce a good or service more efficiently (with fewer resources) than another.

Advanced Recovery Fee
Fee added to product prices to prevent improper disposal and reduce waste material stream.

Anti-Dumping Duty
A tariff imposed by governments on imports priced below their domestic value to protect local industries from unfair competition.

B

Backward Innovation
Building a more basic version of an existing product for a lesser-developed market.

Bilateral Trade
Trade between two countries.

Bill of Lading
A contract and receipt for shipped goods crucial in trade logistics.

Bill of Materials (BOM)
A list detailing the raw materials, components, parts, and their quantities required to manufacture a product.

Biomimicry in Trade Routes
The design and production of materials, structures, and systems that are modelled on biological entities and processes.

Blanket Rate
A rate that does not increase according to the distance a commodity is shipped.

Bulk Shipping
The shipping of large quantities of goods that are loaded onto shipping vessels without packaging.

Bullwhip Effect
A supply chain dynamic where order variations to suppliers are more pronounced than sales fluctuations to buyers, causing supply chain disruptions.

C

Circular Economy
An economic system based on the reuse and regeneration of materials or products for sustainable production.

Chain of Custody
The documentation showing the full process of acquisition, transfer, handling, and disposition of physical and electronic materials.

Chargeable Weight
The weight or volume of a shipment used in determining air, vehicle or ocean charges.

Commodity Fetishism
An anthropological term from Marx, suggesting people have social relationships with objects, often neglecting the conditions of production behind them.

Containerisation
A shipping method in which a large amount of material is packaged into large standardised containers.

CSV Format
A digital format for efficient data exchange that optimises supply chain operations.

Currency Exchange Rates
Value comparisons between currencies, influencing global trade dynamics.

Customs Clearance
The procedure where goods undergo verification to ensure they meet cross-border trade regulations.

D

Demand Forecasting
The process of predicting future product demand for efficient production and inventory.

Dematerialisation
In economics refers to the reduction in the quantity of materials required to produce goods or services over time.

Digital Twin Supply Chains
Virtual, real-time simulations of supply chains to forecast supply chain dynamics.

E

Economies of Scale
Cost reductions due to increased production efficiency.

Economy of Vertical integration
A strategy to reduce costs by consolidating the production chain internally, rather than using external suppliers or contractors.

Economic Policies
Guidelines set by governments or institutions to influence and determine a country's economic direction.

Export Credit Agency (ECA)
Institutions offering financial support to companies for overseas business.

Export Processing Zones (EPZ)
Economic areas with tax benefits to boost export industries and foreign investments.

F

Free On Board (FOB)
A shipment term that determines when the responsibility for shipped goods transfers from the seller to the buyer.

Free Trade Zones (FTZ)
Areas with customs benefits to enhance trade and foreign investments.

Freight Forwarders
Entities coordinating the transportation for streamlined import-export operations.

G

Global Sourcing
The practice of procuring goods from international suppliers for cost and diversity benefits.

Green Supply Chain Management
Eco-friendly supply chain practices that minimise waste and emissions.

H

Harmonised System (HS)
A standardised system of numbers to classify traded goods for customs purposes.

Hinterland
In logistics, a land or district behind a coast or river shoreline that serves both for imports and for exports.

I

Import and Export Compliance
Actions meant to ensure that import-export regulations are observed.

Import Tariffs
Taxes on imports that protect local industries and influence international economic dynamics.

INCOterms (International Commercial Terms)
International standards for shipping that define buyer and seller responsibilities.

Information Asymmetry
In economics, the study of decisions in transactions where one party has more or better information than the other.

L

Landed Cost
Total cost of a product from the factory floor to the consumer.

Leachate
Highly toxic liquid byproducts resulting from the decomposition of waste.

Logistics Hub
A centre for organising, storing, and transporting goods, often near transport nodes.

M

Multimodal Transport
The transportation of goods under a single contract, but performed with at least two different modes of transport.

O

Origin Certificate
A document indicating a product's country of production.

P

Port Facilities
Areas for loading/ unloading services that boost international trade and regional economics.

Price Fluctuation
Economic metric that is used to determine the rate of increase or decrease in the price of goods and services within a market.

R

Raw Material Supply Volatility
Unpredictable fluctuations in raw material availability due to environmental, geopolitical, and economic factors impacting prices and supply stability.

Resource Allocation
The process of assigning resources like materials and labour for optimal supply chain efficiency.

Reverse Logistics
The process of managing product returns and disposal, emphasising recycling and value recovery.

S

Supply Chain Capitalism
As conceptualised by Anna Tsing, a model highlighting the global scale and inherent diversity of modern capitalism, underscored by outsourced labour, just-in-time delivery, data-driven decisions, and economies of scale.

Supply Chain Integration
The coordination and interlinking of processes, information, and logistics across a product's entire lifecycle, from suppliers to consumers.

Supply Chain Transparency
Full visibility of goods' lifecycle, emphasising stakeholder accountability.

Supply Chain Resilience
The capacity of supply chains to endure disruptions from various global challenges.

T

Trade Facilitation
Removing obstacles to the movement of goods across borders to encourage economic growth.

Trade Flow
The movement and exchange of goods and services across borders or between regions.

Trade Liberalisation
Removal or reduction of restrictions or barriers on goods and services between nations.

Trade Routes
Pathways for transporting goods, pivotal in shaping global trade patterns.

Trade Surplus
A situation in which the value of goods that a country exports is more than the value of goods it imports.

W

Warehousing
The act of storing goods that will be sold or distributed later.

Waste Management
The activities and actions required to manage waste from its inception to its final disposal.

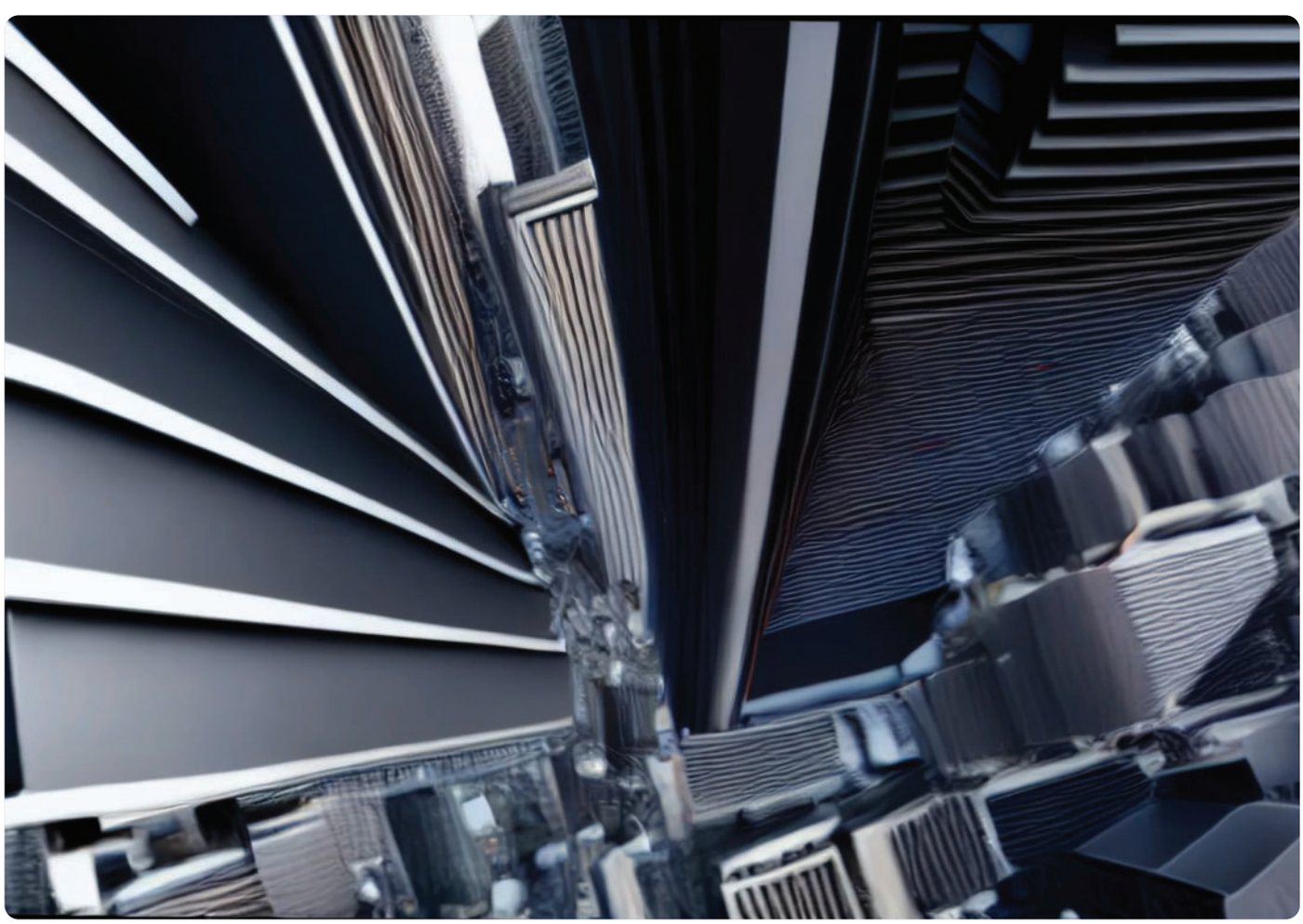
Credits
Data visualisations: Federico Santarini
AI-generated visuals: Bianca Schink, Alex Foradori

Data Sources
Petrovici, Alexe, Bejinariu, 2023. ‘Economy in Timișoara: Territorial Distribution of the Economy in the Timișoara Metropolitan Area’

The Growth Lab at Harvard University. The Atlas of Economic Complexity:
- Where did Romania export Electronic Printed Circuits in 2020
- Where did Romania export Epoxide Resins in 2020
- Where did Romania export Refined Copper in 2020
- Where did Romania export Rubber Tyres in 2020
- Where did Romania export Car Seats in 2020
- Where did Romania export Insulated Electrical Wire in 2020
- Where did Romania export Car Lights in 2020

A Lexicon of Orientation: Industrialisation and Technological Level

LEXICON 07.09.2023



DATA VISUALISATION

Subject: Industrialisation and Technological Level
Location: Timișoara

An analysis of the technological level of enterprises in Timișoara across various economic sectors, complemented by a study on the workforce of five leading companies in the city: Dräxlmaier, Continental, Flextronics, Azur, and Nokia, detailing their employees' places of residence and educational backgrounds.

INSIGHTS BY SOCIOLOGIST NORBERT PETROVICI

Technological Levels and Ownership Ties
Foreign corporations have been crucial in driving technological progress in the industrial areas of Timișoara since 2012. Recent foreign investments have elevated factories to medium-high technological levels, and numerous companies in the business service sector have adopted advanced technologies. These foreign investments have been the key force behind the technological upgrade in Timișoara.

Unravelling Investment Dynamics
While foreign companies and those in certain industries are more prone to form alliances, the complexity of these relationships should not be overlooked. New ownership is key in supplying businesses with an influx of capital and investments. Numerous patterns affect the ties between domestic and foreign companies, shedding light on the dynamics that shape the corporate landscape in Timișoara, Romania, and the global economy.

Patterns in Technological Collaboration
Our research reveals interesting patterns in the technological levels of business collaborations. Companies with higher or medium technological levels usually make alliances with others possessing comparable technological capabilities. This inclination towards collaboration based on technological prowess is especially prominent among foreign companies, which often invest in firms that equal or exceed their own technology levels.

Networking Preferences in Business Partnerships
As indicated in the 'Economy in Timișoara: Territorial Distribution of the Economy in the Timișoara Metropolitan Area' research report conducted for Bright Cityscapes, there is a preference among companies to link with well-connected nodes, entities with a broad range of connections, while consciously steering clear of partners with existing shared business associations. The size of a company is also a crucial factor in the dynamics of business partnerships, as firms of comparable sizes are more inclined to form ownership ties.

Foreign Dominance in Timiș County's Corporate Landscape
In Timiș County, large companies are more likely to be foreign-owned than domestic, and these larger foreign companies usually form ties with other large companies. Moreover, foreign companies often form ownership relationships with fellow foreign entities. This highlights the importance of attaining balance and compatibility in fostering collaborations, as well as the inclination of foreign companies to operate somewhat in isolation, creating clusters disconnected from the wider economy due to the lack of domestic counterparts with comparable technological capacities.

Sectors Attracting Foreign Investment
Certain economic sectors in Romania are particularly appealing for foreign direct investment. These sectors include electrical and electronic, chemical, real estate, automotive, clothing and textile, and ITC. Although the general belief is that foreign firms mainly focus on goods and services for foreign markets, the thriving automotive sector in Timișoara reveals a more complex narrative. Foreign investments in Timișoara are drawn to sectors closely linked to the automotive supply chain, which includes electrical and electronic manufacturing as well as the chemical industry.

Ownership Ties in Sectoral Spotlight
In Timiș County, sectors such as medical, financial, energy, education, and sports are primarily composed of domestic enterprises. Additionally, certain sectors such as medical, financial, real estate, and ITC have a strong tendency towards forming ownership connections. On the other hand, such connections are less likely to be created in sectors such as education, sports, automotive, electrical and electronic, energy, construction, clothing and textile, and chemical. For companies in this latter category, establishing relationships may pose more challenges.

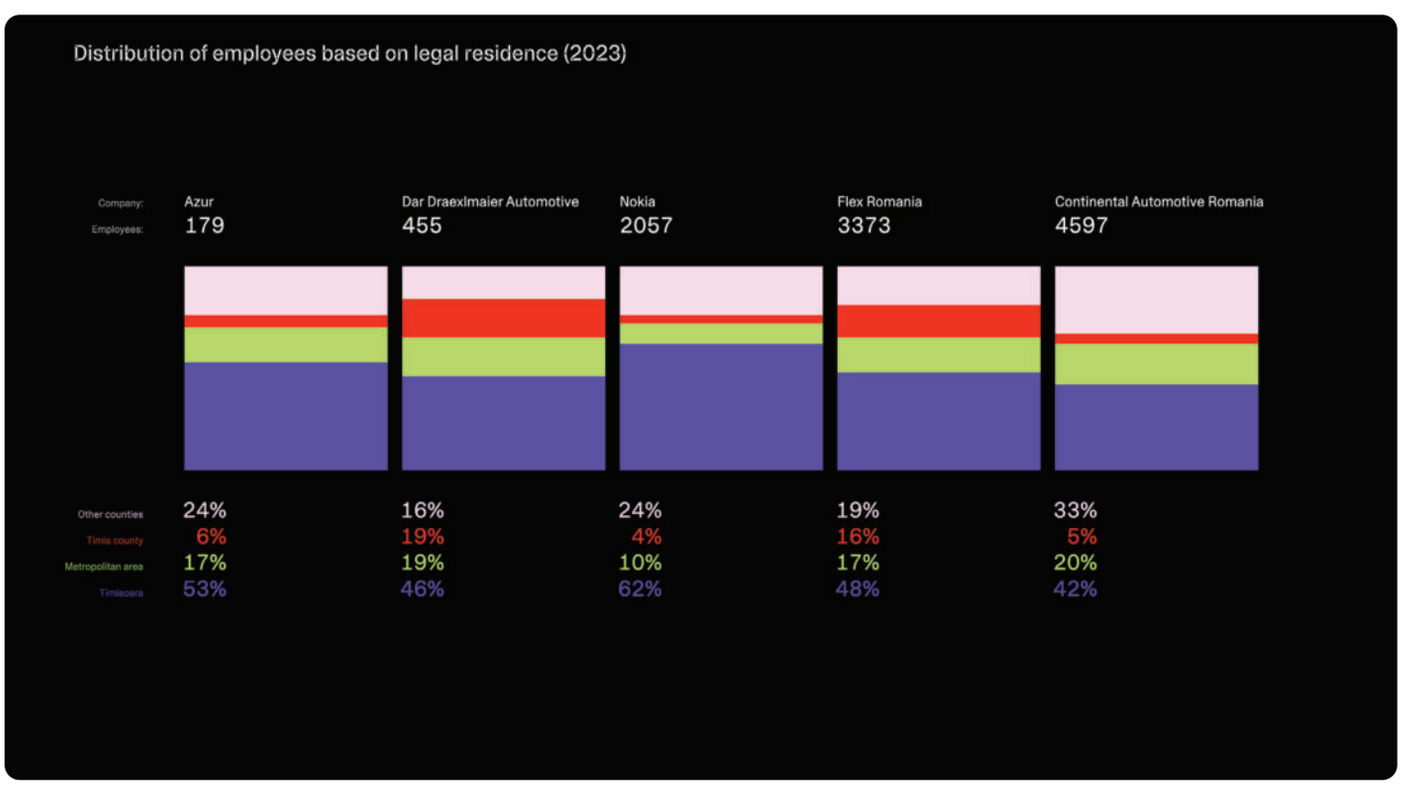
Domestically-Driven Technological Advancements
In sectors not directed towards exports, domestic capital is at the forefront, although the situation in Timișoara provides a more nuanced view. The financial sector, largely made up of financial companies rather than banks, has experienced a significant increase in startups since 2020. This growth is driven by a post-pandemic inflow of global funds and a focus on digitalisation. A considerable number of these startups are domestically owned, while others have foreign stakeholders holding significant stakes, highlighting their mutual interest in Romania's development. The financial sector has emerged as a key investor in Timișoara's domestic business service startups with notable technological potential, thereby becoming a driving force in the city's technological upgrade.

AI-GENERATED VISUALS

./prompt: industrialisation, drives, cities, into, rapid, expansion, decisions, on, land use, are, regulated, by, zoning, shaping, today's, cityscapes, technological advancements, support, infrastructural development, transforming, urban, landscapes, spatial ordering, plays, a, pivotal, role, in, organising, these, evolving, spaces, while, dispositioning, manages, the, intentional, arrangement, of, resources, as, cities, grow, surplus extracting, is, a, frequent, practice, affecting, regions, differently, some,

areas, once, industrial, giants, now, form, the, Rust Belt, bearing, the, scars, of, deindustrialization, a, shift, to, services, announces, the, era, of, post-industrial society, ownership, dynamics, influence, economic specialisation, economic transformation, and, economic diversification, amid, these, shifts, global cities, emerge, acting, as, the, backbone, in, a, complex, network, of, international, relations, and, trade, and, some, with, a, vision, for, the, future, strive, towards, the, ideals, of, smart cities, and urban green spaces

Classification of enterprises in Timișoara by technological level within industrial and service domains. (Still from animated data visualisation)



Number of employees at five leading companies based in Timișoara, analysed during the research. (Still from animated data visualisation)

GLOSSARY

A

Anthropocene
A term denoting the era when human activity began significantly affecting Earth's climate and ecosystems.

B

Brownfield Development
Buildings developed on sites previously used for industrial or commercial purposes.

Building Information Modeling (BIM)
A process involving the generation and management of digital representations of the physical and functional characteristics of places.

D

Deindustrialisation
The reduction of industrial activity or capacity in a region or economy due to various factors.

Digital Colonialism
The decentralised extraction and control of data from citizens with or without their explicit consent through communication networks developed and owned by Western tech companies.

Dispositioning
The act of arranging elements in a specific order or pattern.

Diversification
In economics, the process of shifting an economy away from a single income source toward multiple sources from a growing range of sectors and markets.

E

Earth System Science
The study of Earth's interconnected processes and systems, encompassing the atmosphere, hydrosphere, lithosphere, cryosphere, and biosphere.

Economic Transformation
The continuous process of moving labour and other resources from lower- to higher-productivity sectors.

Economies of Agglomeration
The benefits companies accrue by clustering in specific urban locations due to inherent cost savings.

Economy of Dependence
A situation where countries or entities are interdependent in areas like trade, finance, and technology.

Environmental Sustainability
The responsibility to conserve natural resources and protect global ecosystems to support health and wellbeing, now and in the future.

Extractivism
The removal of large quantities of raw or natural materials, particularly for export with minimal processing.

F

FIRE Economy
The sectors of Finance, Insurance, and Real Estate.

Foreign direct investment (FDI)
An investment from a party in one country into a business in another country.

Fossil fuels
A generic term for non-renewable energy sources such as coal, coal products, natural gas, derived gas, crude oil, petroleum products, and non-renewable wastes.

G

Gentrification
The transformation of a low-income urban area by incoming wealthier residents, often displacing the original community.

Geoengineering
Technological intervention aimed at changing climate systems.

Global City
Urban centres that play pivotal roles in international economy, culture, and networking.

Global Connectivity
The interconnectedness of countries, cultures, and economies through technology, communication, and trade.

Global Financial Centres
Cities that influence international capital flow.

Greenfield Land
Undeveloped land in an urban or rural area either used for agriculture or landscape design, or left to evolve naturally.

H

Horsepower
The power an engine produces. One horsepower is about 745.7 watts. One mechanical horsepower lifts 550 pounds (250 kg) by 1 foot in 1 second.

I

Industrialisation
The period of social and economic change that transforms a human group from an agrarian society into an industrial society.

Industry 4.0 (Fourth Industrial Revolution)
The next phase in the digitisation of the manufacturing sector, characterised by digitisation, cloud computing, and the Smart Factory.

Information Flow
The exchange of information among people, processes, and systems within an organisation.

Infrastructural Development
The construction of basic foundational services in order to stimulate economic growth and improve the quality of life.

L

Land Use
Management and modification of natural environment or wilderness into built environment.

Lefebvrian Right to the City
Derived from Henri Lefebvre, the idea that urban inhabitants should have a say and rights over their urban environment.

M

Manpower
The number of people working or available for work or service.

Modelling Systems
Tools for simulating and analysing real-world processes or systems.

O

Ownership
The act, state, or right of holding legal possession over a resource or property.

P

Peri-Urban Areas
Transitional zones between rural environment and urban centres characterised by a mix of rural and urban land uses.

Post-Industrial Society
The societal transition accompanying a shift from manufacturing to services.

R

Resource Curse
The phenomenon where nations with abundant natural resources often face slower economic growth and poorer development than those with fewer resources.

Rentier State
A country that derives all or a substantial portion of its national revenues from the rent paid by foreign interests on the country's extractive resources.

Rust Belt
Regions facing industrial decline and abandoned factories rusted from exposure to the elements.

S

Sacrifice Zone
A geographic area that has been permanently impaired by environmental damage or economic disinvestment.

Smart City
Urban area leveraging technology for sustainability and efficiency.

Spatial dispersal
Distributing entities or activities across an area.

Spatial Inequality
Disparities in resources and living standards across different urban regions.

Spatial ordering
The organisation of elements within an area.

Specialisation
In economics, the process of an organisation concentrating its labour and resources on a certain type of production to be more efficient.

Structural mechanics
Field of applied mechanics in which you compute deformations, stresses, and strains in solid materials.

Suburbanisation
The process by which populations move from urban centres to outlying residential areas, often driven by factors such as urban congestion, housing demand, and infrastructure development.

Surplus extracting
The process by which surplus value, typically in the form of profits, is derived from labour or resources beyond their basic cost of reproduction.

U

Urban Decay
A process in which a previously functioning city, or city area, falls into disrepair and disuse.

Urban Freight Distribution
The system and process by which goods are collected, transported, and distributed within urban environments.

Urban Green Spaces
Eco-friendly areas in cities to offset industrial impacts.

Urban Heat Island (UHI)
An urban area that is significantly warmer than its surrounding rural areas due to human activities.

Urban Metabolism
In urban economics, a model to facilitate the quantification of the inflows, outflows, and accumulation of resources (such as materials and energy) in a city.

Urban Morphology
The study of urban forms and of the agents and processes responsible for their transformation over time.

Urban Network Analysis
Studying urban components to discern patterns and areas of improvement.

Urban Governance
How government and stakeholders decide to plan, finance, and manage urban areas.

Urbanisation
The population shift from rural to urban areas due to industrial attraction.

Urban Resilience
The capacity of urban systems to absorb, adapt to, and recover from external shocks and stresses.

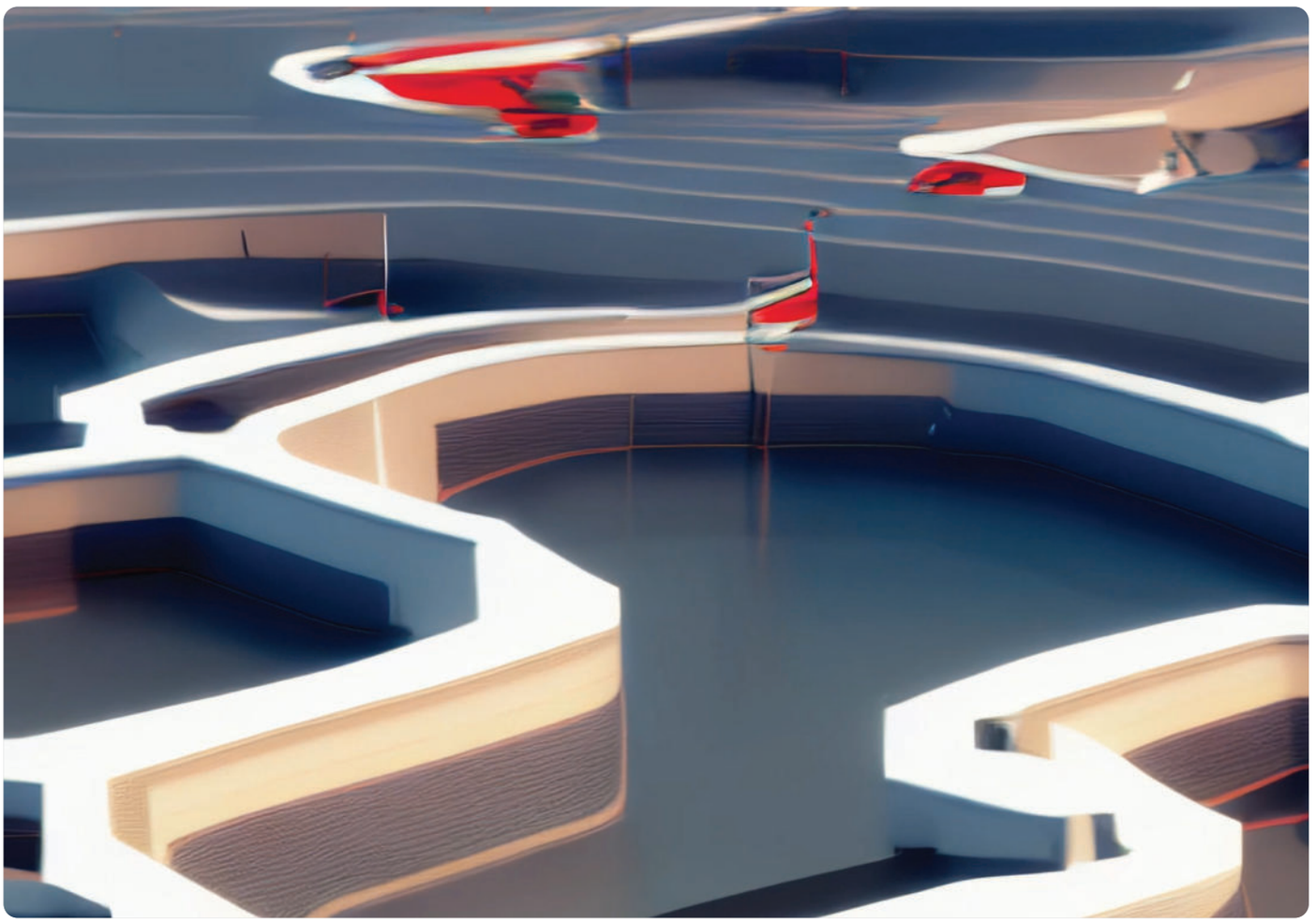
Urban Street Network
A system of interconnecting lines and points that represent a system of roads for a given area.

V

Vertical Urbanism
The process of building and constructing upwards as opposed to outwards to conserve space.

Z

Zoning
The regulation of land use to determine urban development and the built environment.



Credits
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Data Sources
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A Lexicon of Orientation: Outsourcing and IT

LEXICON 07.09.2023

DATA VISUALISATION

Subject: Outsourcing and IT
Location: Romania

This examination of the Foreign Direct Investment (FDI) in Romania is structured around two core areas of focus. The first analyses the evolution of outsourcing in the period of 1995 to 2022, emphasising the top five counties. Additionally, a heat map illustrates the workforce distribution in firms wholly owned by foreign capital for 2002, 2008, 2012 and 2021. The second area presents a detailed assessment of sectors that attracted the most FDI between 2011 and 2022.

INSIGHTS BY SOCIOLOGIST NORBERT PETROVICI

2003–2008 FDI Transformation in Western Romania
Until 2003, the industrial sector of Romania faced significant challenges. Nevertheless, the first wave of FDI from 2003 to 2008 had the most pronounced impact on the Western counties, including Timiș County. These changes were largely driven by advancements in the supplier network of the automotive industry. Furthermore, in Timișoara, its highly mechanised, well-aggregated agricultural lands, and a well-integrated food industry supply chain were crucial in this transformation, drawing a significant influx of FDI.

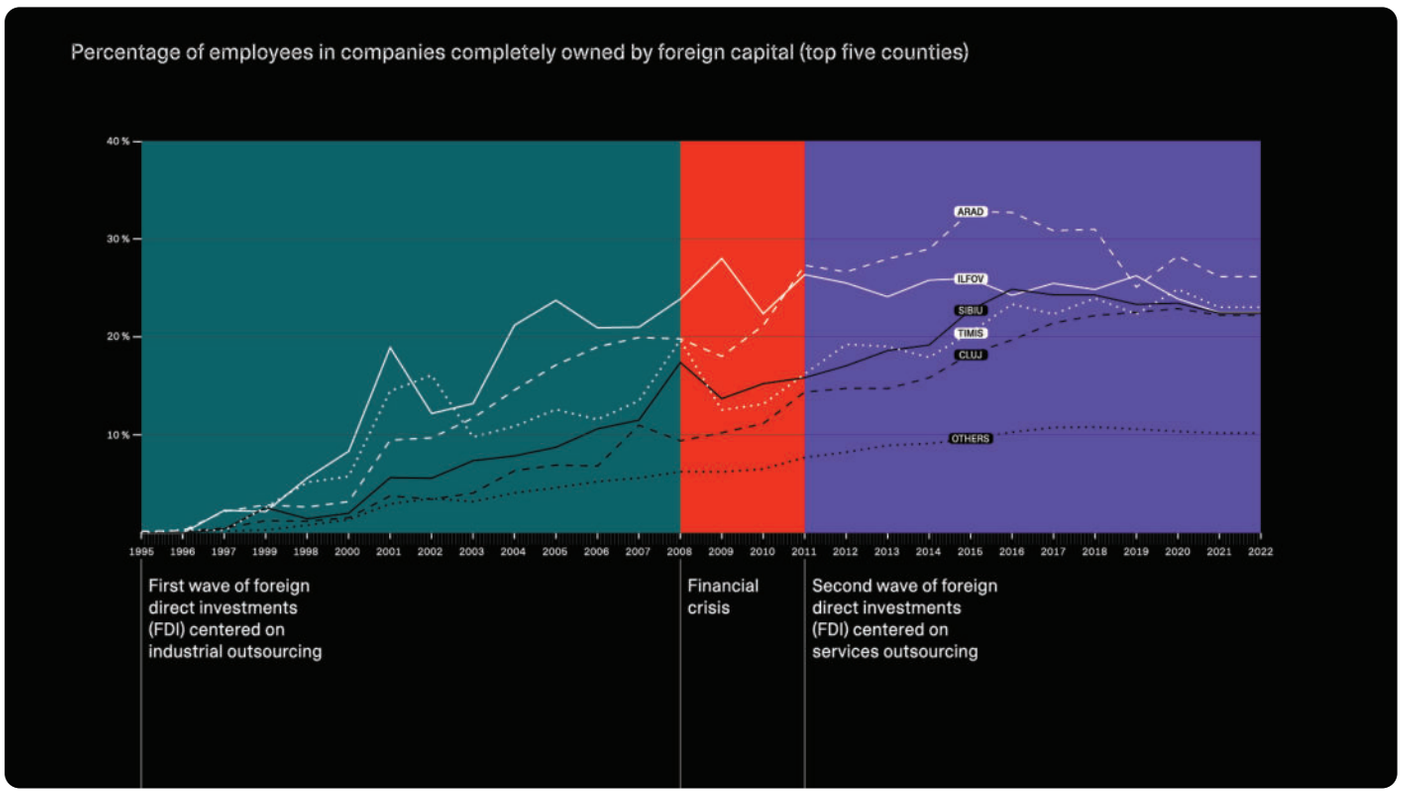
Post-2008 Recovery and Technological Advancements
After the Global Financial Crisis of 2008, there was a significant wave of factory relocations from Western Europe, especially from supply chains centered in Germany, to Central and Eastern Europe. Romania became a prominent destination for FDI, characterised by a series of technological upgrades that resulted in the production of more advanced and complex products. Although this technological progress increased turnover, it did not correspondingly increase employment levels within the sector. In fact, the number of employees remained relatively stable, accounting for approximately one-third of the total waged workforce.

Rise of White Collar Business Services
As part of the post-2008 industrial upgrade, investments in white collar business services increased, with cities like Timișoara, Bucharest, Cluj, and Iași receiving considerable benefits. Nonetheless, Timișoara continued its unique economic growth trajectory, concentrating on engineering services and an expanding ITC sector. Although these sectors flourished, they frequently functioned independently in terms of supply and demand.

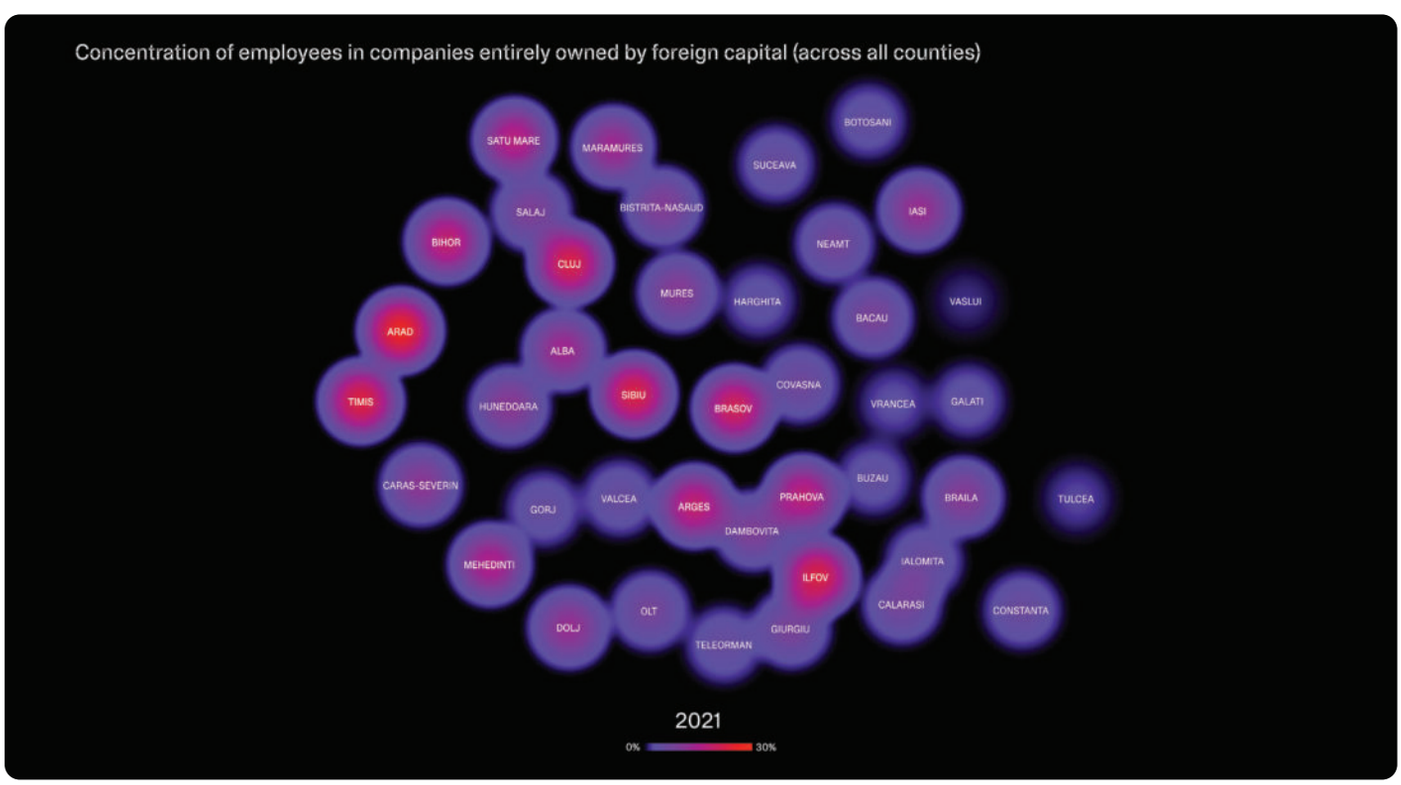
Internationalisation of Construction and Real Estate
After 2008, there was a significant increase in the internationalisation of the construction and real estate sectors, with real estate drawing a considerable portion of FDI. This internationalisation was made possible by converting former industrial sites within cities into large-scale urban reconstruction projects, necessitating substantial capital, capacity, and planning efforts, and generating high returns. Timișoara became a key destination for this wave of global capital, mainly aimed at transforming industrial sites into new neighbourhoods. However, these newly developed areas frequently lacked appropriate social services and infrastructure. Moreover, the shift towards an export-driven economy in the post-2008 period fueled growth in urban retail and logistics. This transformation aligned with the rise of the middle class and an influx of multinational companies.

AI-GENERATED VISUALS

./prompt: in, the, evolving, IT, sector, outsourcing, becomes, instrumental, in, reshaping, business, architectures, boundaries, shift, power, dynamics, morph, and, an, emergent, terrain, materialises, this, transformation, integrates, global, tactics, with, local, preferences, through, glocalisation, while, standardising, practices, across, diverse, cultures, highlighting, cultural homogenisation, supported, by, data centres, and, cloud services, businesses, undergo, fragmentation, redistributing, tasks, while, maximising, efficiency, networked labour, emerging, from, a, diversified, global talent pool, intersects, with, traditional, in-house productions, decentralisation, propagates, diffusing, decision-making, authority, DevOps, bridges, software, and, IT, dynamics, and, cybersecurity measures, enhance, technological dependence, the, vast, web, of, telecommunication networks, ensures, seamless, interactions, vital, in, this, digitised, framework, vendor management, refines, the, selection, and, coordination, processes, crafting, the, future, of, IT's, outsourced, landscape



Timeline of outsourcing waves in Romania since the 1990s: the first wave from 1995 to 2008 was characterised by industrial outsourcing. Following a brief period marked by the financial crisis, the second wave began in 2011, emphasising service outsourcing. Accompanied by the percentage of employees in companies completely owned by foreign capital across the top five counties in Romania during its distinct outsourcing waves. (Still from animated data visualisation)



Concentration of employees in companies entirely owned by foreign capital across all counties. (Still from animated data visualisation)

GLOSSARY

A

Acculturation
Cultural modification of an individual, group, or people by adapting to or borrowing traits from another culture.

B

Big Data
Automatically generated data sets that are so large or complex that traditional data processing applications are inadequate.

Business Process
Reengineering (BPR)
Redesign for enhanced performance.

C

Cloud Services
On-demand computing resources for flexible outsourcing.

Captive Center
Company-owned foreign units managing certain processes.

Comparative Advantage
The ability of a country or firm to produce a particular good or service at a lower opportunity cost than others.

Competitiveness
The ability and performance of a firm, to sell and supply goods and services in a given market, in relation to the ability of other firms or countries.

Contractual Terms and Conditions
Legal agreements in outsourcing contexts.

Core-Periphery Model
A concept derived from World Systems Theory, where core countries dominate and exploit periphery countries.

Cultural Alignment
Assessing values and beliefs for successful collaboration.

Cultural Homogenisation
The assimilation of business practices across different cultures due to widespread outsourcing.

Cybersecurity Measures
Protocols and tools to ensure data protection in outsourcing.

D

Data Centers
Facilities with infrastructure for hosting servers and data storage.

Decentralisation
The act or process of moving control from a centralised point to various units.

DevOps
Practices bridging software development and IT operations.

Digital Divide
The gap between individuals, regions, or countries in terms of their access to and capacity to use IT and digital resources.

Digital Twin Outsourcing
Leveraging virtual replicas of physical assets or processes to improve and optimise operations.

Displacement
Relocation of tasks to external entities.

Distributed Software Development
The planning and managing of software creation with teams spread across multiple locations.

E

Exit Strategy and Contingency Planning
Plans ensuring smooth termination of outsourcing relations.

F

Fragmentation
The act or process of breaking down tasks across diverse entities.

G

Geoeconomics
The study of the spatial, temporal, and political aspects of economies and resources.

Gig Economy
A labour market characterised by the prevalence of short-term contracts or freelance work as opposed to permanent jobs.

Global governance
The system of rules, norms, and actions that guide and coordinate the behaviour of transnational actors, promoting cooperation, and addressing global challenges.

Global Talent Pool
Database of international professionals available for collaboration.

Glocalisation
Business adaptations to both local and global contexts.

H

Hardware
Physical components essential for IT outsourcing.

HR Systems
Software applications used to manage human resources and related processes throughout the employee lifecycle.

Hydroelectric Energy
A form of renewable energy that uses the power of moving water to generate electricity.

I

Infrastructure as a Service (IaaS)
A form of cloud computing that provides on-demand virtualized computing resources over the internet, owned by a service provider.

In-house Production
Functions performed internally without external involvement.

Insourcing
Reverting to in-house operations from previously outsourced tasks.

Intellectual Property Protection
Legal measures such as patents, copyright, and trademarks to safeguard creations from unauthorised use.

Internet Connectivity
Reliable connections for data transfer and communication.

K

Knowledge Process Outsourcing (KPO)
Assigning advanced tasks to experts.

M

Multi-Sourcing
An outsourcing approach in which products or services are contracted to various suppliers.

N

Nearshoring
Outsourcing to geographically proximate regions.

Networked Labor
Labor facilitated by interconnected relationships and digital platforms.

O

Offshoring
Outsourcing in different geographical locations.

Outsourcing
The procurement strategy involving external entities for tasks traditionally executed internally.

P

Platform as a Service (PaaS)
A cloud computing model where a third-party provider delivers hardware and software tools to users over the internet.

Post-Fordism
A system characterised by new information technologies and decentralised production.

Power Infrastructure
Stable power supply for IT operations.

R

Repatriation
The return of persons, material heritage, and/or associated knowledge to its place of origins.

Resource-Based View
A management device for determining the strategic resources a firm can exploit to achieve competitive advantage

Risk Assessment and Mitigation Strategies
A process that addresses potential challenges and risks in outsourcing.

Robotic Process Automation (RPA)
The use of software robots or ‘bots’ to automate highly repetitive and routine tasks.

S

Service Level Agreement (SLA)
Agreement dictating the quality and speed of services.

Software
Applications and tools needed for outsourcing.

Specialisation
Concentrating expertise in specific domains.

Staff Leasing
An arrangement that allows companies to oversee daily operations, while the outsourcing provider manages payroll, facilities, and essential resources for the staff.

T

Technological Dependence
Reliance on foreign providers for technology.

Technology Exploitation
The application of novel technological or scientific advancements to enhance product functionality or manufacturing processes.

Tech Stack Modernisation
The process of outsourcing the update or replacement of legacy systems with modern technologies.

Telecommunication Networks
Networks ensuring connectivity between outsourcing entities.

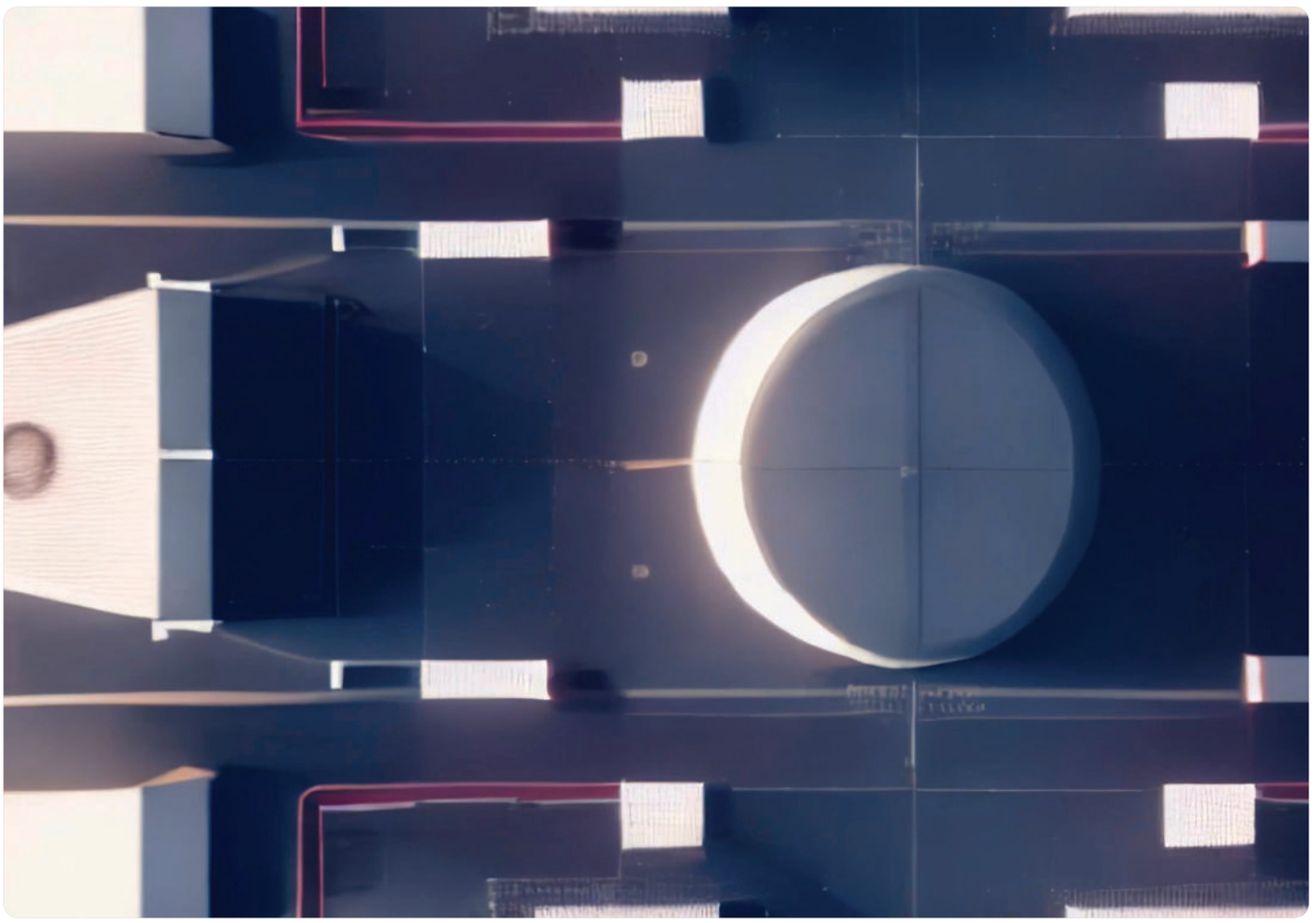
Testing Tools
Software and processes ensuring functionality in outsourcing.

V

Vendor
Entities contracted for specific services or products.

Vendor Management
The process by which a corporation sources, assesses, engages, and ensures timely service delivery from various vendors.

Vendor Selection Process
Methodology to choose suitable outsourcing partners.



Credits
Data visualisations: Federico Santarini
AI-generated visuals: Bianca Schink, Alex Foradori

Data Sources
Petrovici, Alexe, Bejinariu, 2023. ‘Economy in Timișoara: Territorial Distribution of the Economy in the Timișoara Metropolitan Area’

A Lexicon of Orientation: Workers, Commuting and Internal Migration

LEXICON 07.09.2023

DATA VISUALISATION

Subject: Workers, Commuting and Internal Migration
Location: Timiș County and Timișoara Metropolitan Area

An analysis of the distribution of population and employment categories in Timiș County from 1950 to 2022 compares the workforce during the Socialist Era (1950-1989) and the Economic Restructuring Period (1990-2021). Distinctions among white-collar, blue-collar, and unwaged labour are emphasised. A map charts employee distribution by residence in the Timișoara Metropolitan Area from 1995 to 2021, highlighting how suburbanisation trajectories have been influenced by capital development.

INSIGHTS BY SOCIOLOGIST NORBERT PETROVICI

Pre-1968: Economic Strategy and Shift
Until 1968, Romania adopted a robust economic strategy focused on strengthening its currency reserves by exporting raw materials like cereals, timber, cement, and oil. At the same time, post-war austerity measures were implemented to control inflation and regulate domestic consumption. Initially, the proceeds from exports were allocated for the renovation of existing factories.

1968: Economic Milestone
By 1962, Romania was well-positioned to initiate its industrial programme, leveraging on export revenues and austerity measures. From 1962 to 1968, new factories were built, propelling industrial expansion and converting the agrarian population into waged industrial workers. This change encompassed not only economic supply-and-demand mechanisms but also forceful actions like land expropriation, mandatory cooperativisation, and low worker wages. In 1968, a crucial economic milestone was achieved in Romania when the number of blue collar workers equalled that of unpaid agricultural workers.

1968–1978: International Monetary Fund (IMF) and Industrial Development
By 1968, the expansion of Romania's industrial production sectors laid the foundation for its application to the IMF. From 1968 to 1978, Romania obtained loans from over 300 banks, including the European Bank for Reconstruction and Development and the World Bank. This financial support powered bold initiatives to upgrade and diversify the industrial sector, concentrating on exporting intermediate goods to West Germany. The chemical and automotive sectors emerged as new pivotal economic areas.

The 1970s in Timișoara
Timișoara gained considerable advantages from these investments, observing the growth of its chemical industry as it replaced textiles. It also evolved into a hub for manufacturing electrical components for the emerging automotive sector and adopted high-tech innovations such as domestically produced personal computers. This period marked a rise in white collar positions in management, engineering, and education, serving both blue collar and white collar workers.

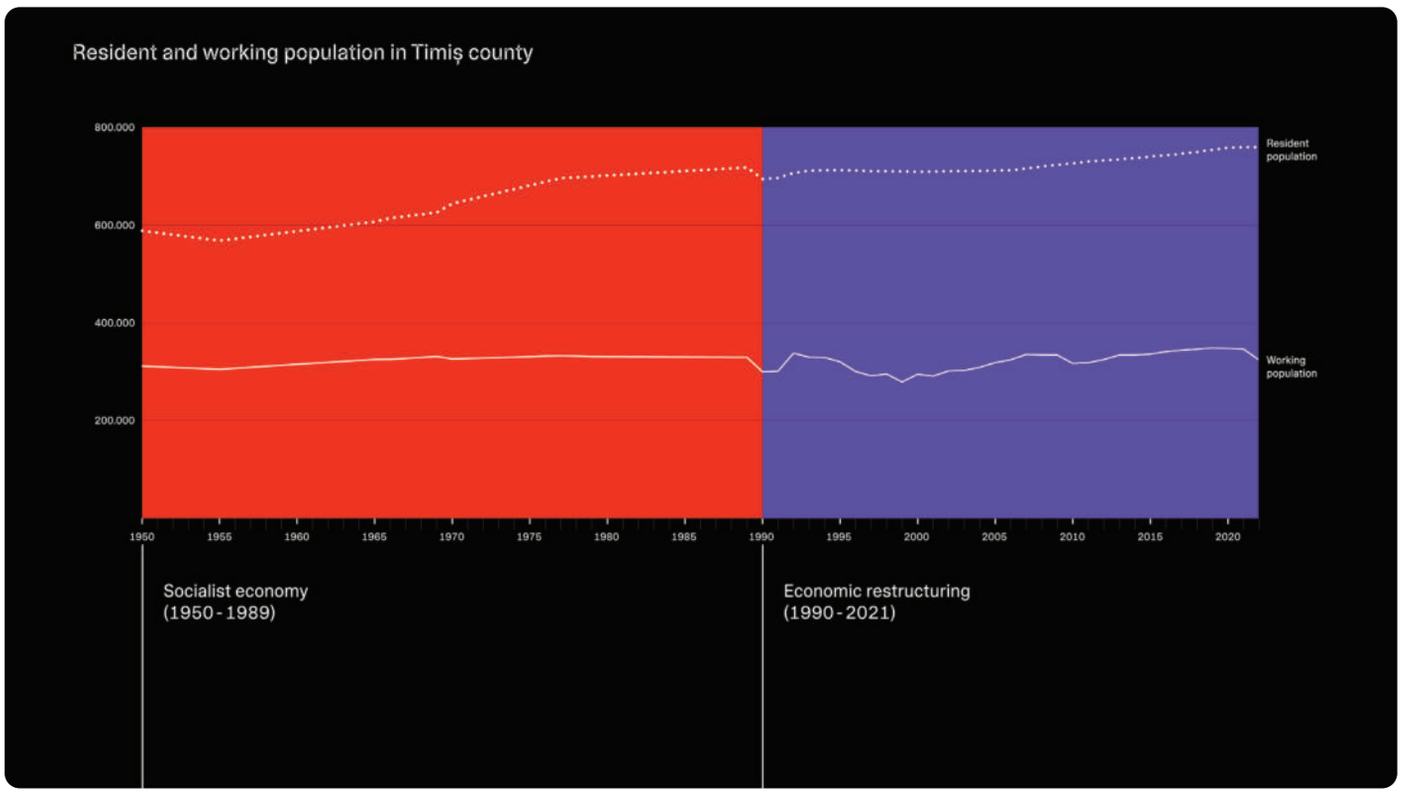
1978: Second Wave of Austerity
In 1978, a second wave of austerity measures was launched in response to the global economic crisis, with the goal of obtaining new loans for Romania. This period saw a notable increase in the workforce in low-tech sectors such as food production, and a new wave of textile and footwear manufacturing, with farmers who were previously unwaged transitioning to advanced state agri-businesses.

Timișoara's 1980s Labour Utilisation
The proliferation of factories, especially in the automotive sector throughout Timiș County and the wider metropolitan area of Timișoara, enabled this transition in employment opportunities. Timișoara possessed the most technologically advanced agri-business in Romania and the entire supply chain required for the food industry. Timișoara demonstrated its proficient internal labor force utilisation by harnessing resources from across the country, substantially contributing to its economic development.

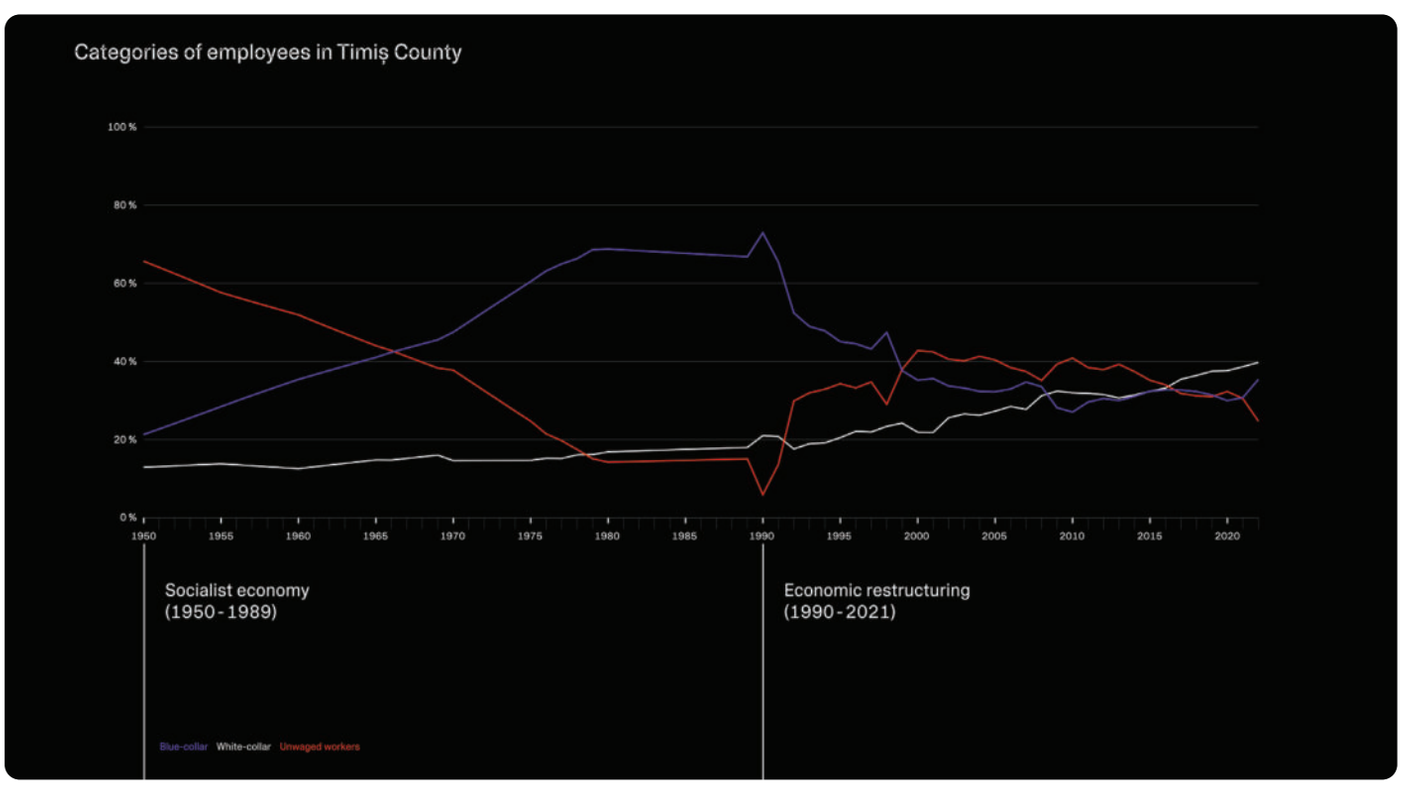
1990s: Timișoara and FDI Success
Throughout the 1970s and 1980s, the industrialisation efforts of Timișoara prioritised the training of professionals to manage new machinery, leveraging international knowledge and expertise. This workforce played a crucial role in attracting Foreign Direct Investments (FDI) to the technical-industrial sector in the 1990s. Consequently, both Timișoara and Timiș County emerged as key FDI targets in Romania, marking a pivotal period in the region's economic development, especially in light of the declining regional and national supply chains of socialist factories.

AI-GENERATED VISUALS

./prompt: amid, the, complexities, of, global movement, commuting, is, transforming, urban, and, industrial, areas, as, boundaries, blur, cultural exchange, becomes, prominent, defining, a, new, commuter landscape, depopulation, stands, in, contrast, with, urbanisation, and, hypermobility, marks, today's, era, traffic congestion, escalates, encouraging, transit-oriented development, diaspora, communities, are, influenced, by, push and pull factors, all, under, the, oversight, of, migration, policy, telecommuting, merges, physical, and, virtual, spaces, and, the, changing, occupational distribution, reflects, shifts, in, service-dominated employment, through, temporal, investigation, from, daily, patterns, to, the, span, of, a, year, in, commuting, movement, and, change, is, observed, rural-urban migration, influences, the, growth, of, megacities, and, each, economic, migration corridor, represents, aspirations, and, journeys, amid, these, shifts, the, concept, of, translocal belonging, emerges, bridging, distances, and, weaving, cultures, in, evolving, urban, landscapes



Analysis of population volume in Timiș County, encompassing both residents and the working population, during the socialist economy (1950–1989) and the subsequent economic restructuring period (1990–2020). (Still from animated data visualisation)



Distribution of the working population in Timiș County by blue-collar, white-collar, and unwaged workers during the socialist economy (1950–1989) and the subsequent economic restructuring period (1990–2020). (Still from animated data visualisation)

GLOSSARY

B

Blue Collar
Workers in manual labour or skilled trades, often in industries like construction or manufacturing.

Building Information Modeling (BIM)
A process involving the generation and management of digital representations of the physical and functional characteristics of places.

C

Carpooling
A practice where multiple individuals share a vehicle for commuting.

Circular Migration
A form of migration in which people repeatedly move back and forth between two or more countries.

Commuter Belt
The area surrounding a city from which a large number of people travel to work each day.

Commuting Corridor
A specific route used by a significant number of commuters.

Country of Transit
A state through which individuals travel between their original residence and their employment destination.

Cross-Border Commuting
Commuting that involves travelling across national borders.

Cultural Capital
A term introduced by Pierre Bourdieu to refer to the symbols, ideas, tastes, and preferences that can be strategically used as resources in social interactions.

Cultural Exchange
Diverse cultural amalgamation due to commuters' influx, leading to a multilingual and multicultural environment in urban centres.

D

Depopulation
The reduction in population in specific areas, often rural.

Deskilling
In the migration context, the reduction or loss of a migrant's skills due to prolonged unemployment or lower-level jobs in a new country.

Diaspora
The movement of people from any nation or group away from their own country.

Disposition
The distribution or arrangement of people or things.

E

Economic Migration Corridors
Paths of migration due to economic gaps and labour needs, reshaping demographics and job markets in target countries.

Employment Rate
The ratio, in percent, of the number of employed persons to total labour force.

Engineer
Professionals trained in designing, constructing, and using machines, applying scientific discoveries to real-world challenges.

Engineering
The application of science and mathematics to design solutions and apply innovations to real-world challenges.

F

Factory Managers
Individuals overseeing factory workers and ensuring efficient production of goods like electronics and cars.

G

Globalisation
A term used to describe the increasing connectedness and interdependence of world cultures and economies.

H

Hypermobility
Extremely high mobility rates, often influenced by modern transportation and telecommunication systems.

I

Informal Economy
Economic activities, enterprises, jobs, and workers that are not regulated or protected by the state.

Internal Migration
Movement within a country, often for economic or social reasons.

International Standard Classification of Occupations (ISCO)
A system by the International Labour Organization (ILO) for categorising occupations globally.

L

Labor Force Survey (LFS)
Statistical surveys conducted in a number of countries designed to capture data about the labour market.

Liquid Labor
A term inspired by Zygmunt Bauman's 'liquid modernity', suggesting the fluid, unstable nature of contemporary work.

Liquid Modernity
Zygmunt Bauman's concept describes the condition of constant mobility and change in relationships, identities, and global economics within contemporary society.

M

Manufacturing Operator
A person in charge of production equipment before, during, and after manufacturing.

Megacity
An urban centre with a population typically exceeding ten million residents.

Migration Flows
Patterns or movements of migrants.

Migration Policy
Government regulations that oversee the movement of people.

Mobility Paradigm
A contemporary paradigm in the social sciences that explores the movement of people, ideas, and things, as well as the broader social implications of those movements.

Modal Split
In traffic engineering, the percentage distribution of different modes of transport.

N

Nomadism
Historically, the practice of moving to new areas in search of resources; now also refers to modern workers moving frequently for job opportunities.

O

Occupational Distribution
The spread of people across different jobs or professions.

P

Pink Collar
Workers in service-oriented roles, often associated with caregiving or clerical work, such as nursing or teaching.

Population Growth
Increase in the number of inhabitants in urban areas.

Postindustrial Urban Economy
An economy that has moved past heavy industry to service and tech sectors.

Push and Pull Factors
Circumstances that either repel or attract migrants.

Q

Quality Adjusted Labour Input (QALI)
An economic metric that considers changes in the quality and composition of labour, like skills, and education, to offer a nuanced view of labour productivity.

R

Reverse Commuting
Commuting from residential areas to urban work centres.

Rural-Urban Migration
Movement from rural areas to urban centres in search of better prospects.

S

Service-Dominated Employment
Economies where service provision is the primary sector.

Socio-spatial Dialectics
A concept that examines space as a social product and a factor in understanding social relations, following Henri Lefebvre's 'The Production of Space'.

Spatial Mismatch
The gap between job locations and the residence of potential workers who can't afford to commute.

Super Commuting
Commuting exceptionally long distances, often exceeding 90 minutes each way.

Sustainable Commuting
Travel practices that minimise environmental impacts.

Surplus Value
In Marxian economics, the difference between the amount a worker is paid and the value the worker adds to the goods or services produced.

T

Telecommuting
Working from remote locations using technology.
Temporal Flexibility
Variations in work hours and schedules include flexitime, overtime, shift work, zero-hours, compressed weeks, seasonal, and annual-hour contracts.

Time-Space Geography
A transdisciplinary perspective on spatial and temporal processes and events such as social interaction, ecological interaction, social and environmental change, and biographies of individuals.

Trade Union
An organised association of workers, formed to protect and promote their rights and interests.

Traffic Congestion
Overcrowding of vehicles, leading to slower movement.

Transit-Oriented Development (TOD)
Urban planning that promotes developments around public transportation hubs.

Translocal Belonging
A sense of connection felt by those who move or reside in multiple localities.

Transport Infrastructure
The physical facilities for commuting, including roads, railways, and more.

U

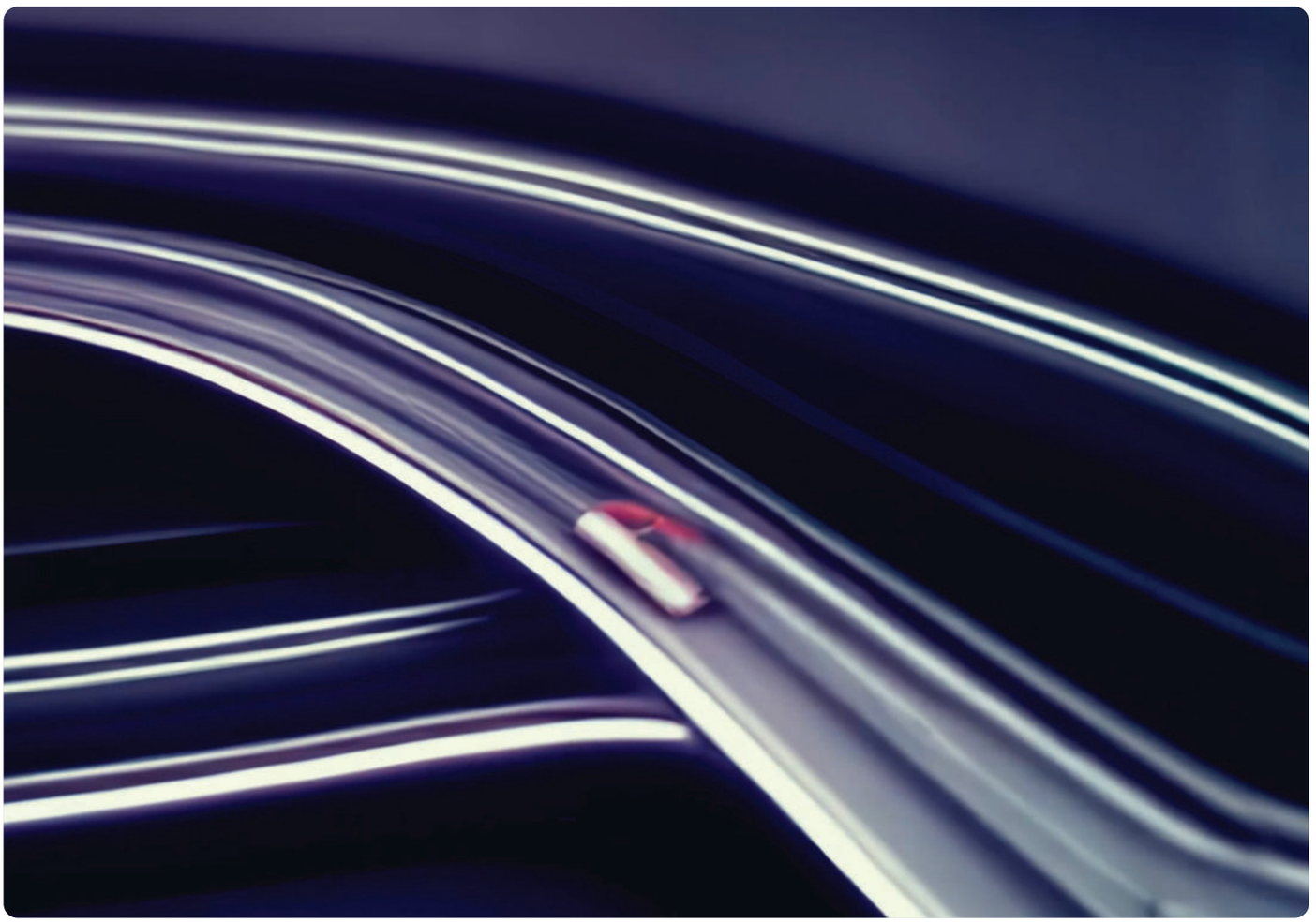
Urban Sprawl
Rapid city and suburb growth with low-density housing, single-use zoning, and car dependence, causing long commutes and environmental issues.

Urban-Rural Migration
Movement from urban areas to rural regions, often due to lower living costs or job opportunities.

Urbanisation
The process of a population shifting from rural areas to urban centres.

W

White Collar
Professionals, often in office settings, working in roles such as management, administration, or sales.



Credits
Data visualisations: Federico Santarini
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Anonymous Materials

Santiago Reyes Villaveces

PROJECT 07.09.2023

Timișoara's distinction as Romania's pioneer in computer production owes much to the socialist-era investments in its chemical and non-ferrous metallurgy sectors. Yet, what if these mineral materials were not passive objects shaped solely by human history, but rather possessed their own intentions and capacities in intricate human-non-human interactions?

'Anonymous Materials' is an assemblage of objects, mineral samples, and geological data, exploring how industrial processes and daily life can be viewed as the outcome of material agency. Under the guidance of Jurca Marius, the samples were selected from the collection of the Faculty of Industrial Chemistry and Environmental Engineering, at the Politehnica University of Timișoara. These were correlated with the Geological Institute of Romania's cartographic database, to develop the geological map mural. The assortment of everyday objects, discarded items, and fragments of the city were gathered during an artistic residency.

The interplay between scientific and poetic languages, knowledges, and research methodologies makes palpable how material agency might manifest as by-products, traces, non-human scales, or disruptions within complex interconnected systems. The legibility transcends the confines of traditional techno-scientific value creation, and signals the possibilities of alternative value systems.

Santiago Reyes Villaveces examines knowledge systems used to control and colonise nature. He uses drawings, installations, moving images, and sculptures as techniques to engage with systems of power and their contemporary materiality.

Jurca Marius is a senior lecturer in the Applied Chemistry and Engineering of Inorganic Compounds and Environment, within the Faculty of Industrial Chemistry and Environmental Engineering, specialising in crystallography and mineralogy, among other things.

Credits
The designer was assisted in developing his painting by: Ciprian Ciobanu, Raluca Micula, Mihaela Vișovan, Amadeea Lazăr.

Data Sources
Petrovici, Alexe, Bejinariu, 2023. 'Economy in Timișoara: Territorial Distribution of the Economy in the Timișoara Metropolitan Area'
Faculty of Industrial Chemistry and Environmental Engineering at the Politehnica University of Timișoara
Geological Institute of Romania
Gold Museum in Brad
Cornel Mera, Cupru Min S.A. and Roșia Poieni Mine
Village Museum in Timișoara
Badea Cârțan Market in Timișoara
Flavia Flea Market in Timișoara

Block Networks

Cristina Cochior

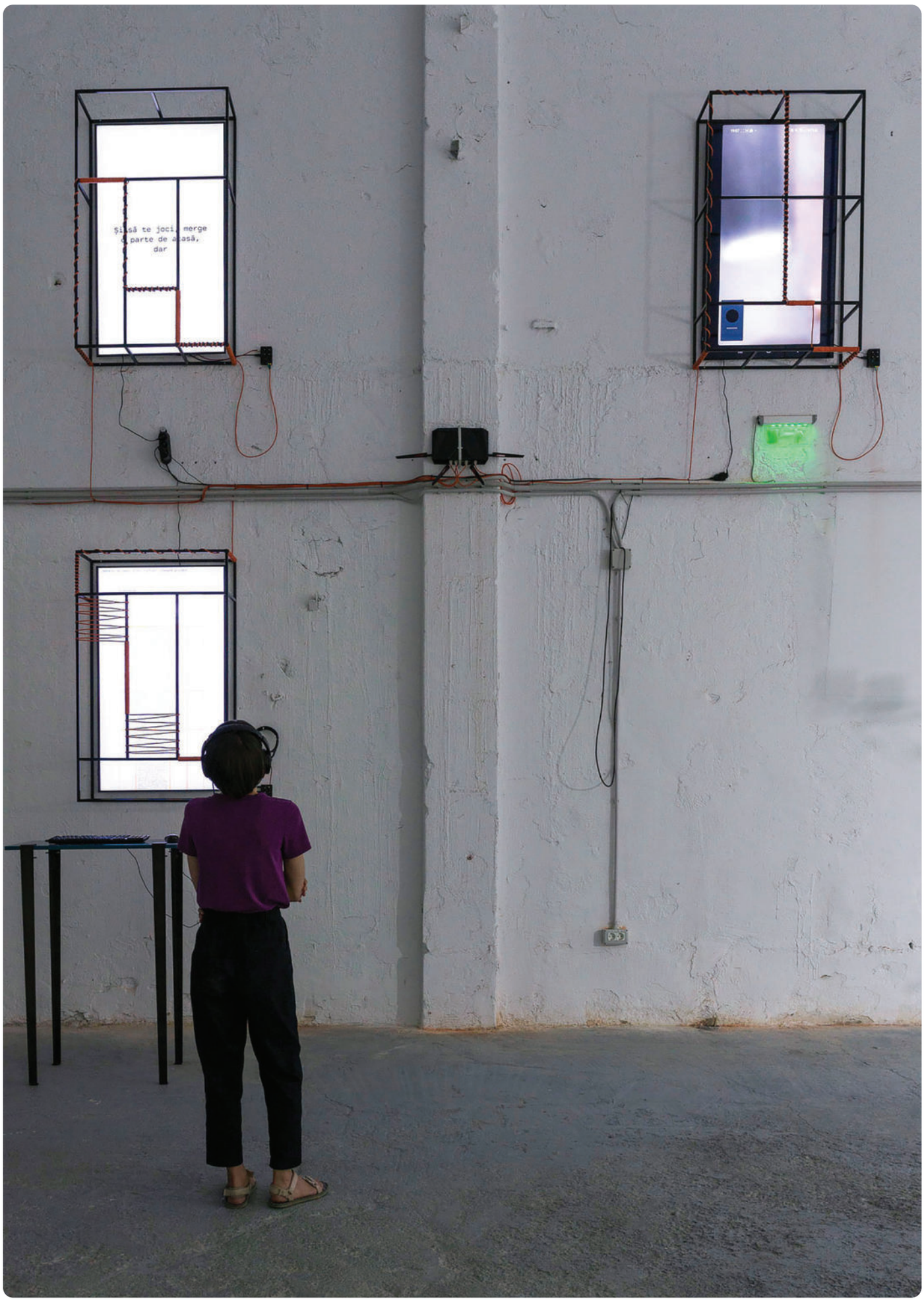
PROJECT 07.09.2023

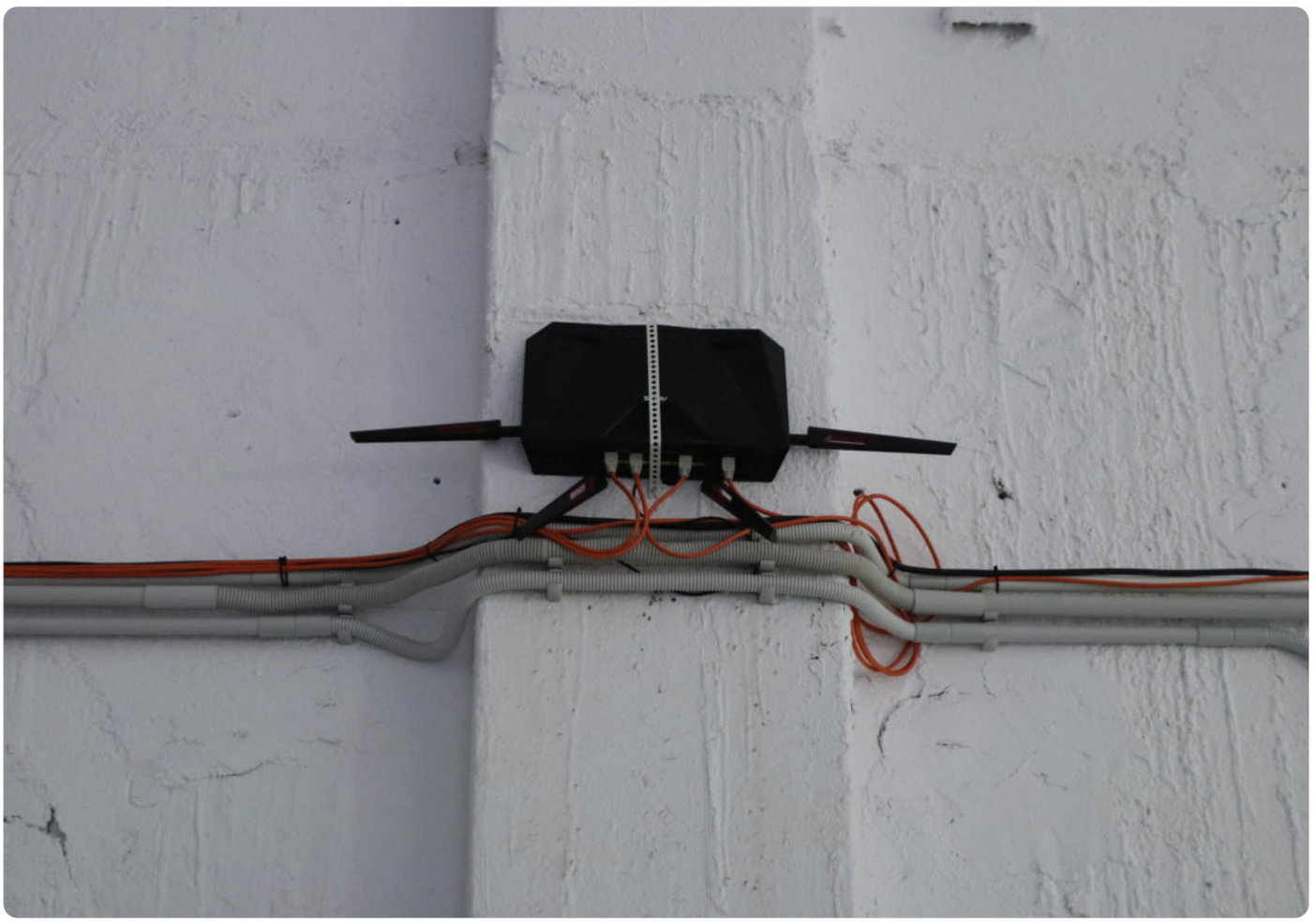
From the late 90s to mid-2000s, Romania's internet landscape buzzed with block or neighbourhood networks. These grassroots networks emerged from a blend of devices, neighbourly bonds, and urban structures, spanning apartments, blocks, and suburbs, delivering internet to diverse groups. Residents strung cables across balconies for shared access, enabling self-sustained services. Gradually, these informal networks morphed into official micro-ISPs, acquired by commercial giants that absorbed network maintainers, formalising their setup.

'Block Networks' archives memories of this period, where grassroots initiatives shaped an infrastructure later claimed by the tech industry. Oral histories, online forums, news, and documents recount these experiences. These are displayed on three computers set up to demonstrate the dynamics of a block network. Connected to the exhibition site's router, the computer network depicts computational and social interdependence.

The project explores self-organised networks' social, political, and economic facets in Romania, examining a kind of user-administrator relationship in which a certain intimacy was established through file sharing, technical knowledge exchange, and physical proximity. When these networks were absorbed by larger companies, these relations were replaced by the commercialised services and transactions.

Cristina Cochior is a researcher and designer with an interest in automation, situated software, and peer-to-peer knowledge production. Her work largely revolves around knowledge organisation systems and collective digital infrastructures.


Și să te joci, merge
o parte de acasă,
dar

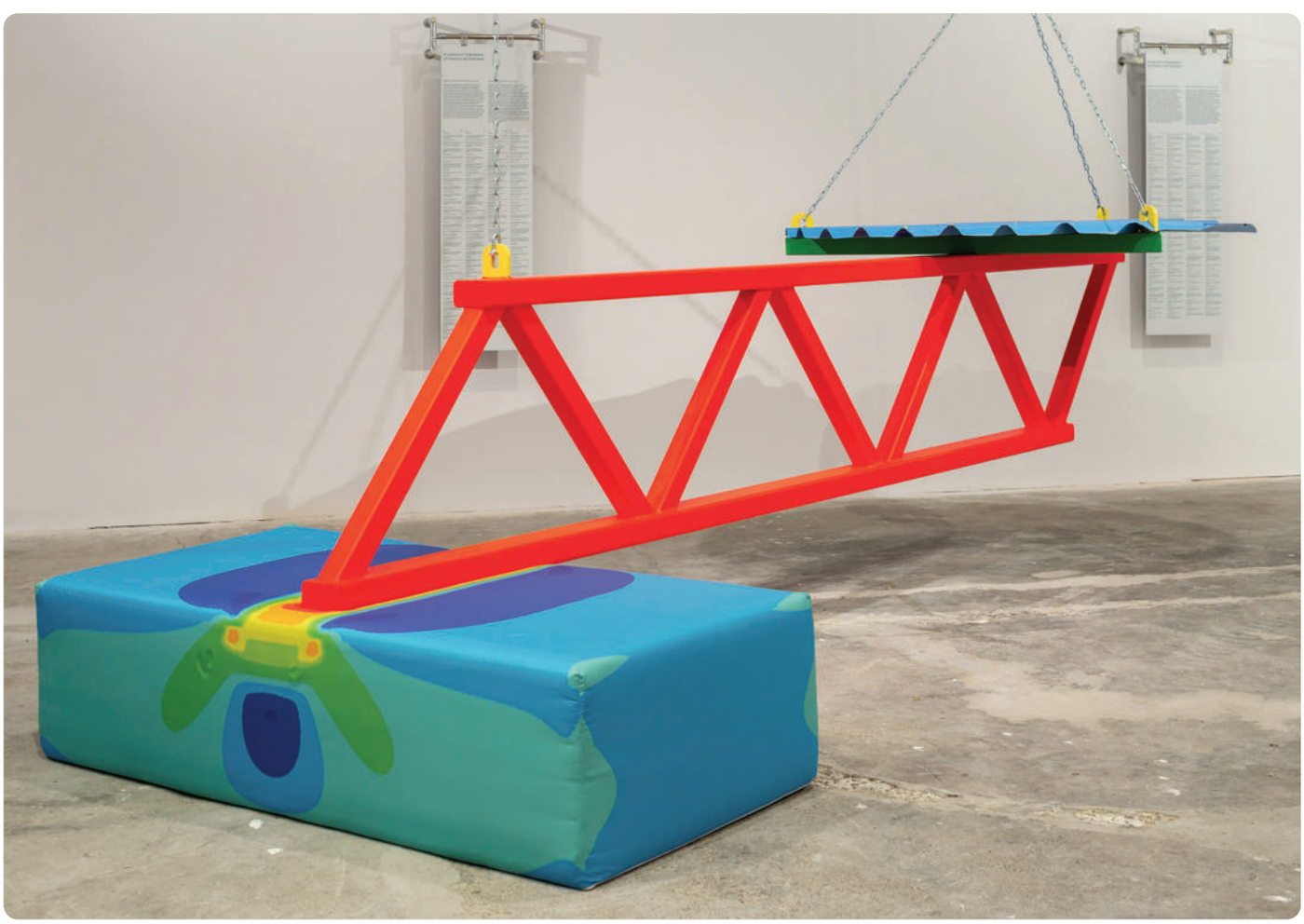


Credits
Conversations with: Paul Sorin Alexandrescu, Eric Baleanu, Una Maria Andruchovici, Ioana Raileanu, Alin Vrajitor, Ciprian Cincheza, Alex Csordas, Val Muresan
Featured conversation: Una Maria Andruchovici, Ioana Raileanu
Transcription and video editing: Ioana Tomici
Online resources are referenced in the archive.

Composition of Stress and Balance N. 1

Parasite 2.0 and Ioan Both

PROJECT 07.09.2023



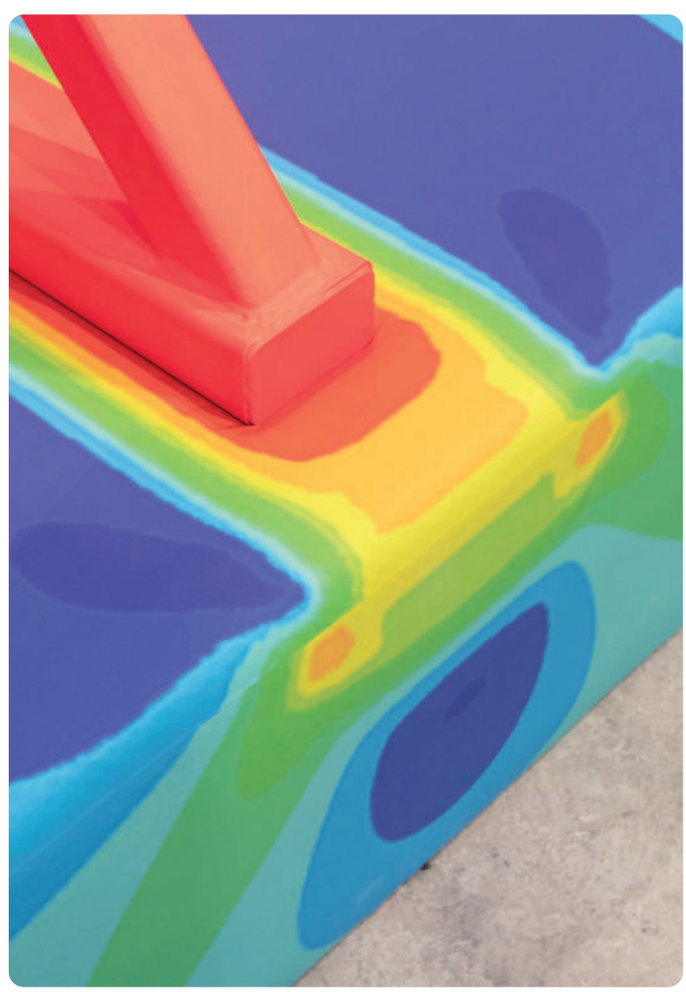
With Timișoara's industrial and economic growth, the city is in a constant state of construction. The materials used in this industry represent an intricate web of hidden engineering, manufacturing, and manpower, ensuring that building stability can be taken for granted. Ioan Both describes this collective effort of finding optimal construction elements to prevent damage during a building's lifespan as 'structural design'.

'Composition of Stress and Balance N. 1' is a sculpture serving as a 3D diagram of latent construction forces. A suspended steel truss, acting as both stressor and connector, impacts a soft mattress covered in a printed textile. A corrugated sheet counters the mattress, achieving sculpture balance in terms of volumetric proportions and structural forces.

The project originates from Parasite 2.0's aesthetic interpretation of Both's research into the production systems of architectural elements, such as trusses, pillars, and corrugated sheets. Interpreting the engineering lexicon of 'stress' and 'balance' artistically, it draws attention to how these words also signal modern labour conditions.

Parasite 2.0 is a design and research agency based in Milan and London. Founded in 2010 by Stefano Colombo, Eugenio Cosentino and Luca Marullo, it investigates the status of human habitats through a hybrid of architecture, design, and scenography.

Ioan Both is a senior lecturer within the Steel Structures and Structural Mechanics department of Politehnica University of Timișoara. His research expertise includes experimental testing of metallic materials, structural elements, and numerical simulations using the finite element method.

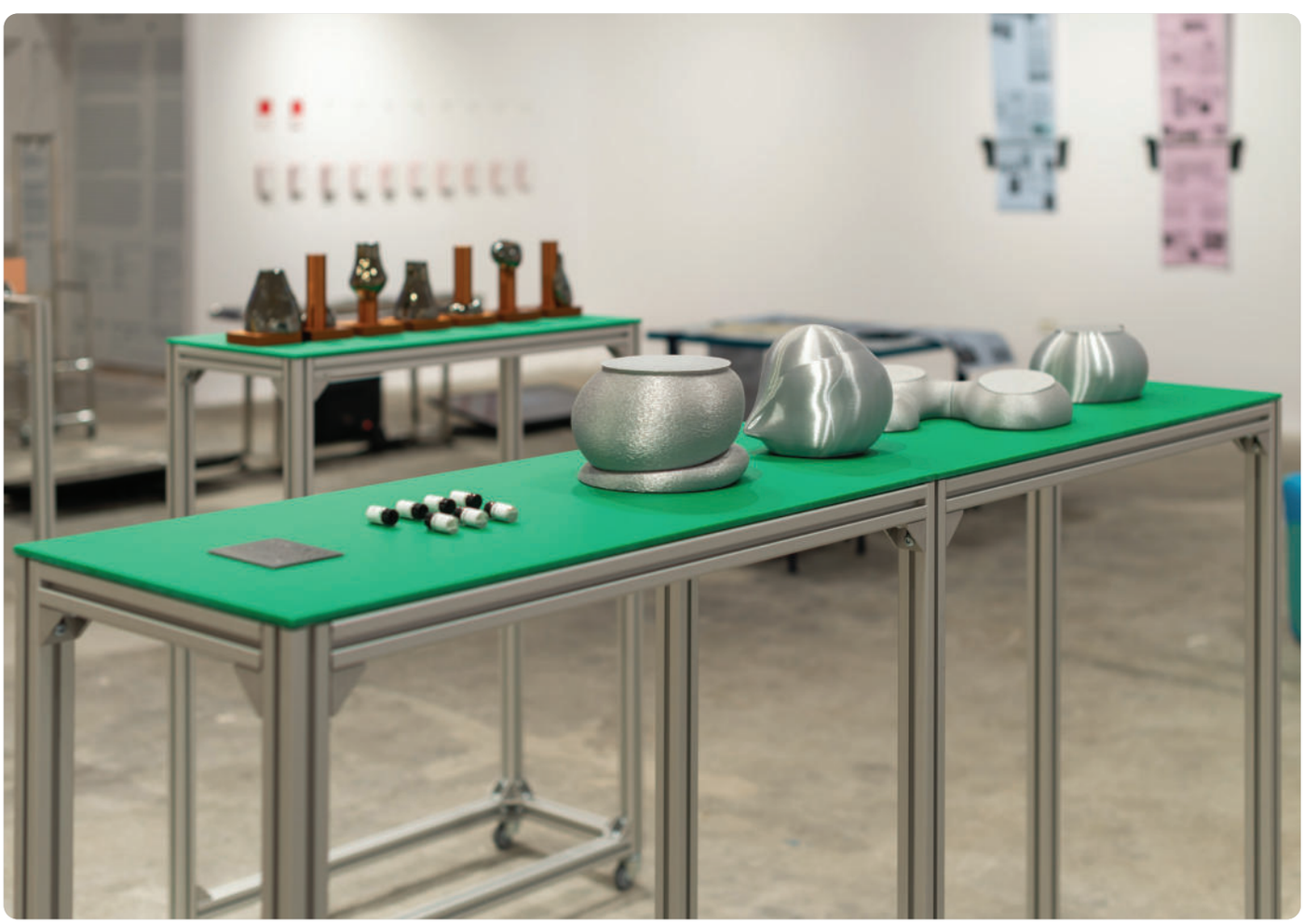


Credits
The sculpture was produced with the technical and material support of SC PROFILE GALVANIZATE SRL.

Error-driven Economy

Jing He and Raul Ionel

PROJECT 07.09.2023

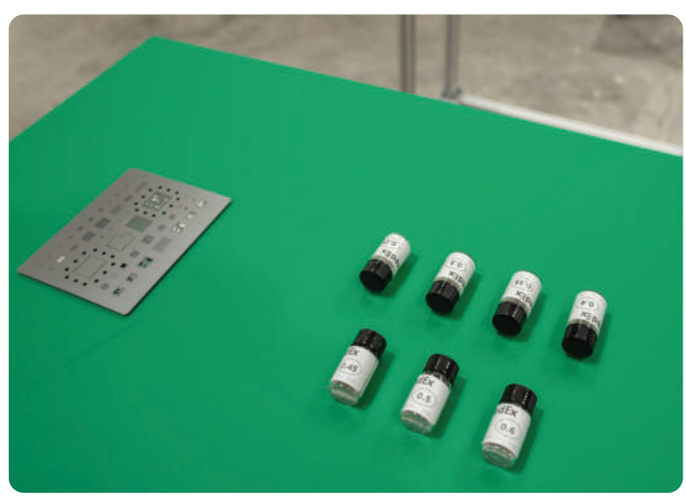


Printed Circuit Board (PCB) assemblies are a vital element in nearly all electronic devices and systems, with a notable industry presence in Timișoara. Precise manufacturing and assembly of PCBs are crucial for functional electronics. Despite being a fundamental technique, errors can occur in the manufacturing process, including soldering, which uses high-temperature melted alloys to connect tiny components in everything from LED lights to smartphones and rockets. Although soldering appears straightforward, its alloy melting process is complex and error-prone. Quality inspection and error correction are essential, alongside economic considerations of which errors warrant expensive detection or correction.

‘Error-driven Economy’ features five aluminium alloy frames alongside different materials such as lead alloy, ceramics, and 3D prints, illustrating common soldering errors on PCBs. These errors adhere to internationally recognised electronic assembly standards that regulate soldering shapes, materials, and textures. The designed objects amplify the aesthetic qualities promoted by these standards, inviting connection and resonance with typically emotionless electronic components.

Jing He is a visual artist and educator based in Rotterdam. Her interest in the culture, politics, and history behind various daily objects leads to imaginative visual representations involving various materials and mediums.

Raul Ionel is an associate professor in the Measurements and Optical Electronics Department of the Faculty of Electronics, Telecommunications, and Information Technologies, at the Politehnica University of Timișoara. His fields of interest are virtual instrumentation, LabVIEW, MATLAB, data acquisition, AOI, boundary scan, and functional testing.



Fluid Dynamics

Théophile Blandet

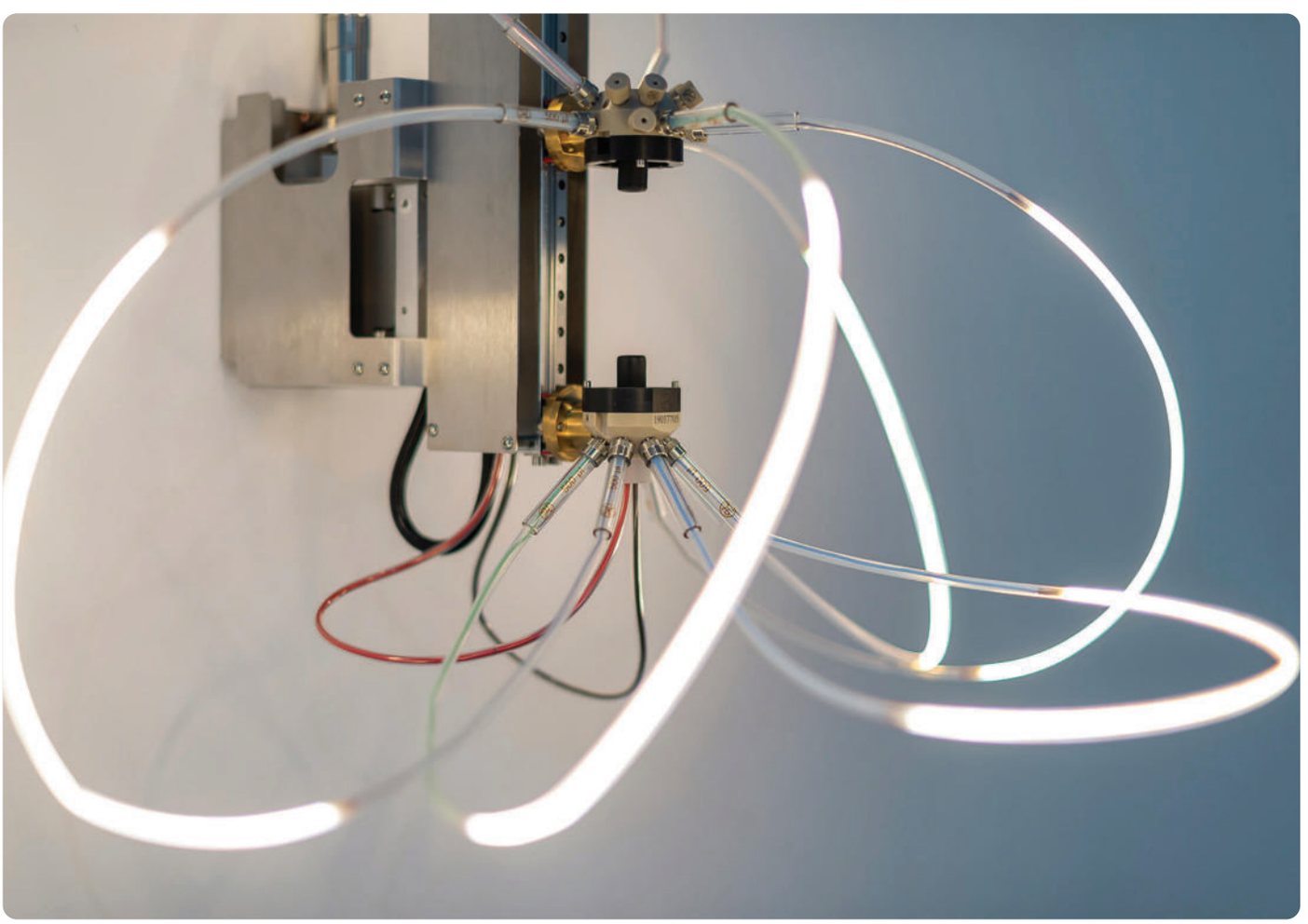
PROJECT 07.09.2023

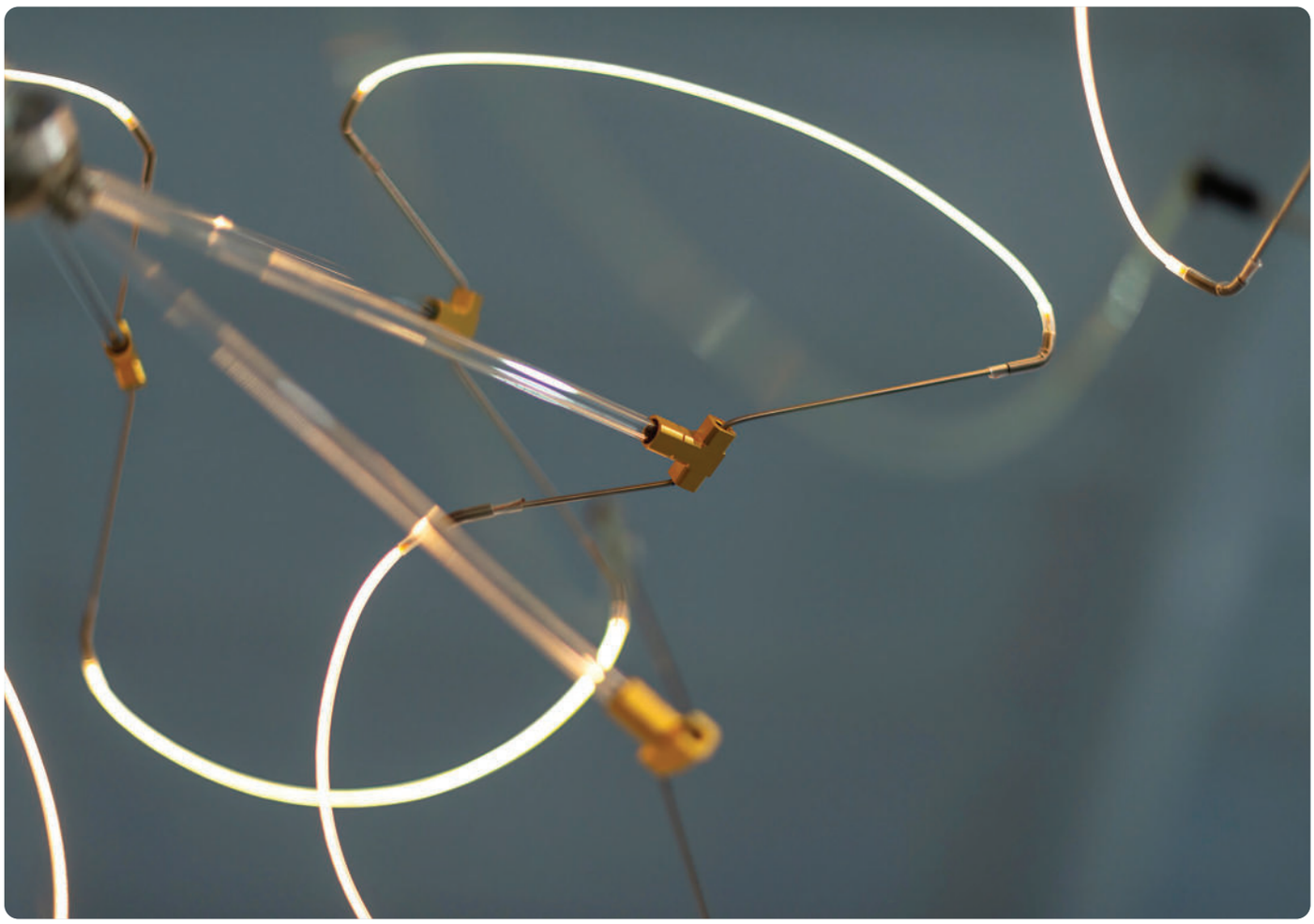
Hamilton Central Europe in Timișoara is a prominent producer of microlitre syringes and high-precision instruments for research laboratories, ranking as the second-largest European hub for the global company, after Switzerland.

‘Fluid Dynamics’ presents two lighting objects conceived during a month-long residency at Hamilton’s Timișoara facility. The designer’s production process encountered disruptive and generative interferences stemming from the facility’s stringent hygiene and security protocols, advanced manufacturing techniques, rare materials, and valuable knowledge.

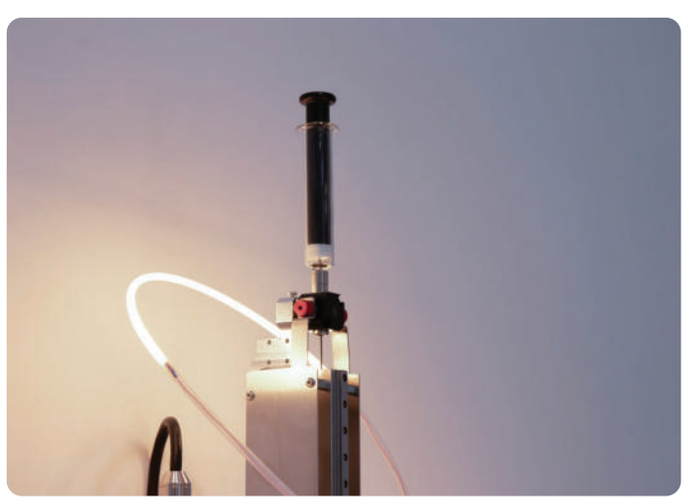
Conversely, the project was deliberately structured to disrupt the facility’s controlled production lines, redirecting attention towards crafting two objects imbued with distinct economic and social values. Sourced from the facility’s bins of discarded components, the objects are made from unique, high-tech parts that are unattainable elsewhere, underscoring the contextual definition of materials, functions, and values.

Given the facility’s exceptional control and technological sophistication, the creation of these objects symbolises the designer’s total immersion in the factory environment. This achievement was only possible through ongoing idea exchange and discussions, which fostered a collaborative sharing of knowledge.





Théophile Blandet is a French artist and designer based in the Netherlands. He works at the crossroads of popular culture and craftsmanship to navigate the notions of functionality and abstraction of ‘infra-ordinary’ objects that resist all efforts of categorisation.



Credits
Hamilton Central Europe SRL: Avram Daniela, Baciu Madalina, Barbu Gabriel, Bihoi Marilena, Bihunet Cristian, Bogdan Aluna, Cacior Andrei, Cernescu Silviu, Dontete Andreea, Farcal Florin, Franca Stefan, Glava Ionel Horatiu, Laslau Constantin, Lupulescu Andrei, Marc Andrei, Mihu Aurora, Nedelea Adrian, Negrau Claudiu Antonio, Nistor Costina, Satz Dorina, Schiopu Nicoleta, Simion Lucian, Sirghi Mihaela, Szoktor Alexandru-Gabriel, Tamirs Vasilica-Daiana, Turcu Emanuel, Ursu Dragos, Vacarescu Delia, Vasile Darius-Deian

From Here to the Cosmos: Incomputable Views of the Above, Under and Around

Guillemette Legrand and Marian Neagul

PROJECT 07.09.2023

Human understanding of Earth's geophysics relies on planetary sensing and modelling systems, such as satellite-imaging and climate modelling. This technological mediation is the only gaze from which the impact of human activity on the Earth's climate can be observed, making it vital for maintaining life on Earth. In terms of visual literacy, however, there lies a gap between local experiences and the algorithmic climate projections that operate beyond human perception. To comprehend the unique aspects of Earth sensing and modelling within the Romanian context, partnerships were established with scientists and technologists specialising in local data, particularly with Dr Marian Neagul.

'From Here to the Cosmos: Incomputable Views of the Above, Under and Around' is an installation that places the viewer in front of a fragment resembling a sphere mesh, an archetype of Earth's shape. Algorithmic simulations of the geophysical condition of Earth are projected onto it, produced by autonomous technical systems. These simulations span various timescales extracted from Timișoara's environments: above (cloud detection), around (land usage detection), and under (ground motion monitoring). A voice-over reinterprets the synthetic visuality and the computational logic behind the installation. The experience disorients spatial perceptions, highlighting the need to question the reliance on visuality, and examine how it is shaping socio-cultural beliefs about the planet and the future.

Guillemette Legrand is an artist and designer affiliated with the research group Reflective Interaction of the EnsadLab (FR) and IXDM (CH). Their practice explores machine-fictioning and other possible imaginations of computational logic and its visual culture.

Dr Marian Neagul is a postdoctoral researcher at the Institute eAustria Timișoara and West University Timișoara. His research topics cover machine learning, distributed systems, computer networks, operating systems, and Earth observation.

Credits
Alex Munteanu
Stephan Meißl of EOX IT Services GmbH for the cloudless mosaic of Timișoara
The Meteorological Office of Bucharest
Dr Delia Teleagă from Terrasigna
Products/Visuals obtained from ESA remote sensing data processed by Terrasigna within the project PN-III-P2-2.1-PTE-2021-0513. © TERRASIGNA 2023
Alex Ionașcu (visualisation and 3D rendering)
Vincent Thornhill
Jim Zweerts

Landscape Mode

Simone C Niquille

PROJECT 07.09.2023

A popular film location, Romania has witnessed a surge in ‘set-jetting’—travel influenced by movies and TV shows, even surpassing social media in holiday inspiration. Following the success of Tim Burton’s Netflix series ‘Wednesday’, tourism boomed. Despite being set in Vermont, the series was filmed across Romanian locations deemed suitable. It has also served as a proxy for Paris, Moscow, and more. Sometimes the reasons are financial, but other times the Romanian film locations provide more predictable weather and have minimal modern infrastructure to remove in post-production. Romania’s folklore has also become globally popularised, with local legends like werewolves, vampires, giants, and ogres seen across mainstream entertainment and inspiring numerous IP franchises.

‘Landscape Mode’ is a panorama to take your own photo among the amalgamated visual culture of outsourced landscapes, appropriated characters, and amplified clichés. It scoured film location databases for films, series, ads, and games that use Romania’s locations as proxies. Based on these proxies and appropriated folkloric characters, figures and landscapes were sourced from online 3D scan repositories and text-to-3D AI tools. Welcome to ‘Landscape Mode’, a place where everything looks eerily familiar, a ghost of binges past, a faint memory of childhood fairy tales, a composite of content.

Simone C Niquille /technoflesh Studio is a Swiss designer and researcher based in Amsterdam NL. Her practice technoflesh Studio investigates the representation of identity and the digitisation of biomass in the networked space of appearance.

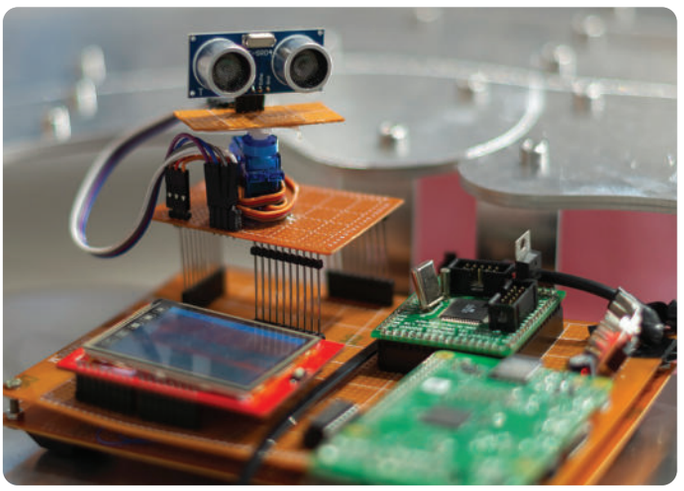
Credits
Green Sand for Evrika Pro Mosaic supported by Azur
FlyboiPhoto
emennpreserve
graygabriel
FluidState Consulting
Neo_minigan
RYOkEkEN
elepiech
nyannya
Brian Zimmer
SriramG
karanganesan
AlphaLegendz
Xarddrax
Popa Cristian Vlad
Andrea Spognetta
Badri Gogia

Synthia

Flora Lechner and Cristina-Sorina Stângaciu

PROJECT 07.09.2023

The automotive industry holds immense significance in Timișoara and Romania, ranking as the 4th largest automotive manufacturing nation in the European Economic Community. While the industry is often viewed from economic and engineering perspectives, the human-car relationship is one of the oldest and most intimate in modern technology. Beyond efficiency, cars serve as motivators for design, with the automotive industry fostering innovations like video processing for autonomous driving, real-time embedded systems, and smart sensing.

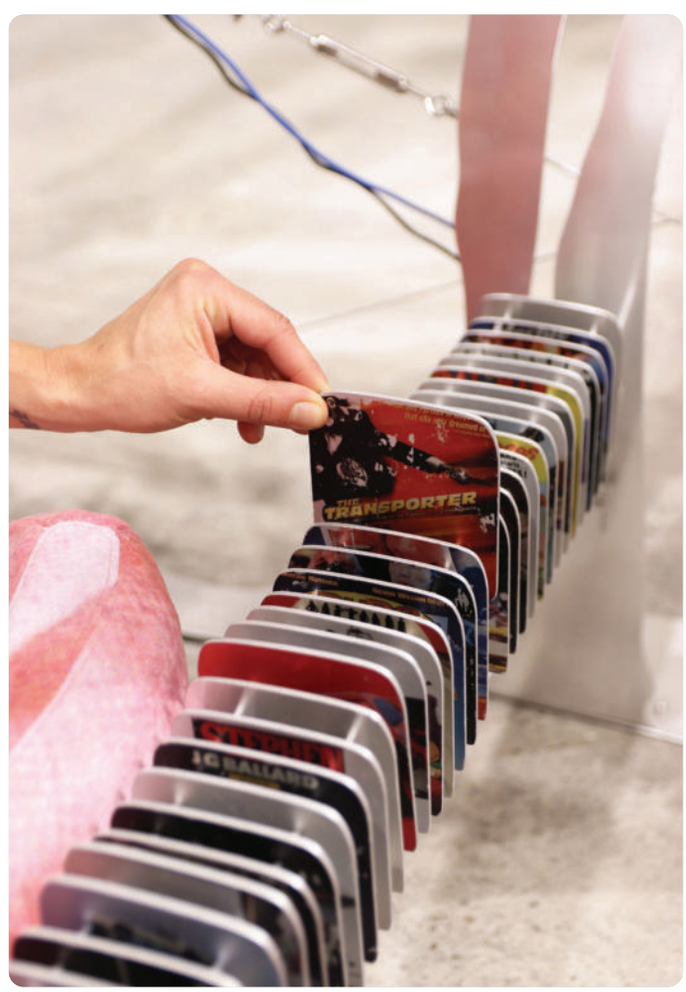


‘Synthia’ is a design installation exploring the dynamics of design and control in the relationship between humans and cars. Synthia is equipped with sensors for interaction and communication with her visitors, who can explore her creative genesis through videos, images, and text. By equating sensors in self-driving cars to human senses, ‘Synthia’ draws attention to the signals that pass between humans and our tools, creating hybrid bodies and prosthetic senses. Portraying the car’s structure as a muscular human body both anthropomorphises cars and acknowledges the human desire for automobile attributes.

Using material fabulation to repurpose these automobile sensors—originally designed for marketability and optimisation—signals how our design and relationship with cars could be very different.

Flora Lechner is an interdisciplinary practitioner who combines art, design, and performance to observe the power relations between bodies, objects, and spaces. She is particularly interested in the human and creative tendency to seek divine perfection.

Cristina-Sorina Stângaciu is a lecturer and a research engineer at the Computer and Information Technology Department of Politehnica University of Timișoara. Her research areas include embedded and real-time hardware-software systems, the Internet of Things, and power management in embedded devices.

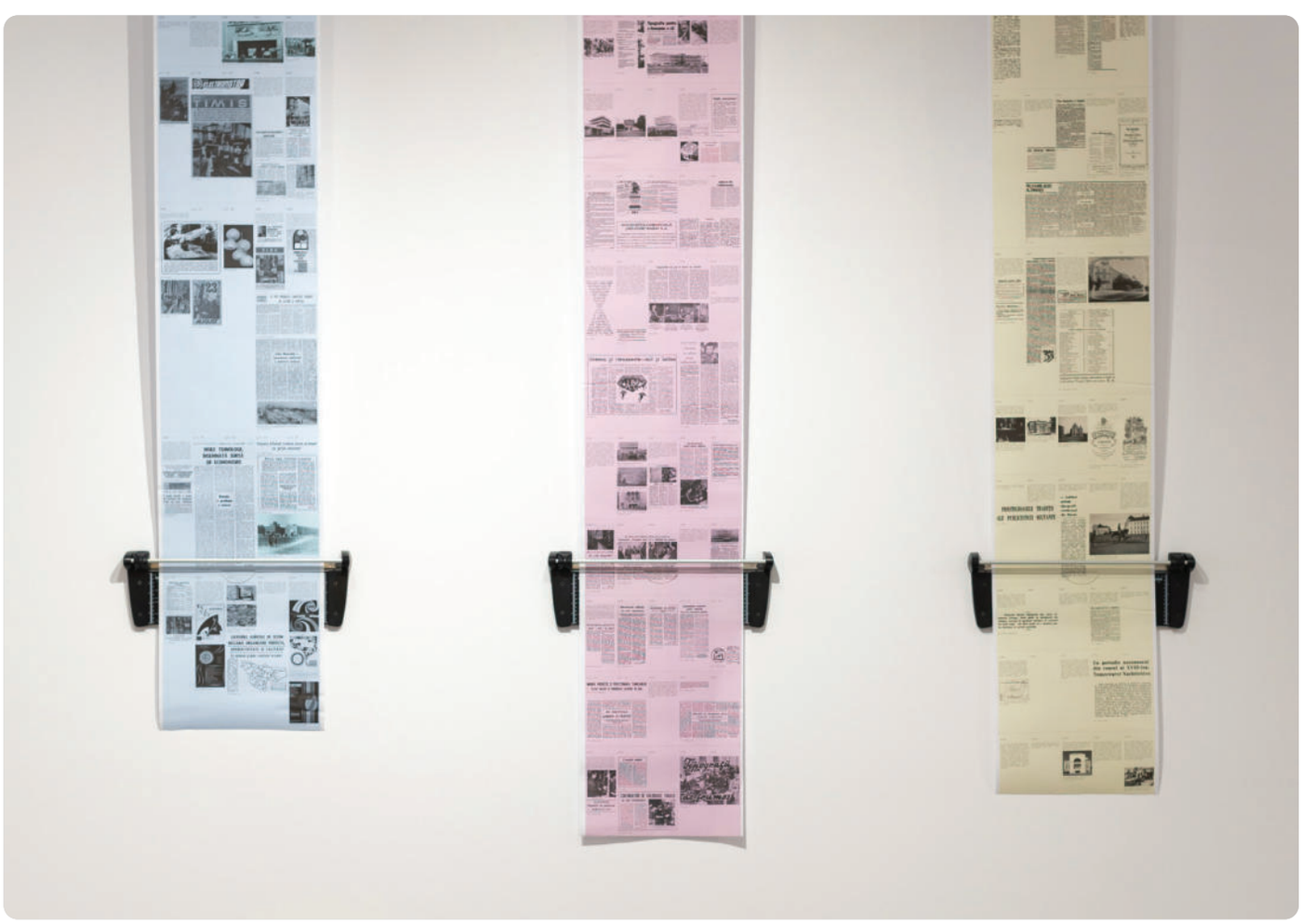


Credits
The embedded sensors were developed at DSPLabs Research Laboratory, Politehnica University of Timișoara, Computer and Information Department, in collaboration with Mihai Micea, Valentin Stângaciu, Răzvan Cioargă, Bogdan Simion, Andrei Ionescu, Victor Alexandru Toporan, Roberta Georgiana Izabela Tomegea, Daniel Prejban, Ștefan Chisăliță

The City is Spinning! Timișoara's Print Ecologies Then and Now

Petre Mogoș and Laura Naum (Kajet Journal)

PROJECT 07.09.2023



The material conditions of living and working in Timișoara emerge from a complex network of historical political systems, dating back to Habsburg rule through today's post-socialism and global digitalisation. Timișoara's print industry not only documented and influenced this transformation but is also a product of interconnected industrial ecologies—from forestry to the chemical sector, from heavy industry to arts and publishing organisations.

'The City is Spinning! Timișoara's Print Ecologies Then and Now' is a non-traditional timeline of Timișoara's print industry, presented as a scroll that can be spun with interactive take-away paper sheets. Using the 'Economy in Timișoara' report as a starting point, the project reassembles data into non-linear chronologies, contextualised through archival research. This opens a conversation between previously overlooked chronicles, narratives, and local organisations in the print industry and beyond.

The patchwork of micro-threads that unfolds not only offers a more nuanced understanding of Timișoara's industrial heritage, but also serves as a reminder that historical narratives and the futures they shape are as adaptable as rearranging the pages of a book or spinning events on a timeline.

Petre Mogoș and **Laura Naum** are the founding editors of Kajet—a journal that seeks to critically map the Eastern European imagination—and The Future of—a magazine that reclaims lost ideas. Petre is a PhD candidate and lecturer at Erasmus University, and Laura runs a bookshop in Bucharest, Dispozitiv Books, which is also a publishing and editorial laboratory.


1980
anii 80
anii 80
anii 80
anii 80
NOILE TEHNOLOGII, ÎNSEMNATĂ SURSĂ DE ECONOMISIRE
Energia, o problemă a tuturor
Fiecare kilowat trebuie acum drămuit cu grijă maximă!
Aerul, apa, liniștea orașului
SUPORTUL REZULTATELOR BUNE LA EXPORT — ORGANIZAREA FLEXIBILĂ A FABRICAȚIEI
RECUPERAREA RECONDIȚIONAREA REFOLOSIREA
E normal, bateriile se uzează, dar elementele utile componente trebuie mai intens valorificate
anii 70
1978
1977
1976
1974
MINISTERUL INDUSTRIEI CHIMICE
gospodine
LUCRĂRILE AGRICOLE DE SEZON
RECLAMĂ ORGANIZARE PERFECTĂ,
OPERATIVITATE ȘI CALITATE!
Să încheiem grabnic recoltatul furajelor!
AZUR
LACURI VOPSELE
PLASTIFIANȚI
SOLVENTUL

Credits
Graphic design: Roos van Zijl and Hanna Shypovych
Interviews: Ovidiu and Silvia Hrin, co-founders of Synopsis™; Sorina Vazelina, visual artist; Florin Fâra, zine-maker, and coordinator of Secret Garden bookshop and Sit and Read Art Book Fair; Cristina Dema from the Jimbolia Press Museum

Data sources
Petrovici, Alexe, Bejinariu, 2023. 'Economy in Timișoara: Territorial Distribution of the Economy in the Timișoara Metropolitan Area'
Bejinariu, 2023. 'The Manchester of Hungary: Developments and Economic Policies in Timișoara between the Danube Empire and Greater Romania'. MA Dissertation, Babes-Bolyai University.
Archival research: Arcanum, Fortepan, Camera Arhiva, Wikimedia Commons

Waste Streams—Tracing Romania’s Tangled Trash

Cinzia Bongino and Versavia Ancuța

PROJECT 07.09.2023

For years, the Romanian press has decried the nation's portrayal as 'the dump of Europe'. All types of waste, both legal and illegal, find their way into Romania via boats and trucks, often facilitated by corruption, economic interests, and political connections. However, the fate of this waste within the country remains largely undisclosed.

'Waste Streams—Tracing Romania's Tangled Trash' investigated the waste management system by analysing statistics, policies, and legislations within Romania and across Europe. Illustrated in the form of a waste sorting facility, one conveyor belt is a visual representation of Europe's waste production, export strategies, and associated directives, shedding light on continental waste dynamics. Another conveyor belt focuses on Romania's waste infrastructure, and its health and environmental impacts.

Drawing on data, news reports, and local knowledge, the project converges diverse entry points into a single stream of information. When viewed as a continuous flow of data involving imports, exports, and materials, the waste system is acknowledged as a trade mechanism, wherein waste functions as a commodity.

Cinzia Bongino is a graphic, information, and web designer. Specialised in UX/UI design and data visualisation, she works with clients and design studios in Italy, Northern Europe, and the United States. She also develops data journalism projects for artistic contexts.

Versavia Ancuța is a computer science lecturer at the Politehnica University of Timișoara, specialising in reliability, complex systems, intelligent agents, and interdisciplinary data mining applications.

Credits
Eurostat
Romanian Ministry of the Environment
Romania Open Data (data.gov.ro)
Border police reports
National and regional Romanian newspapers.

Working Class Hero

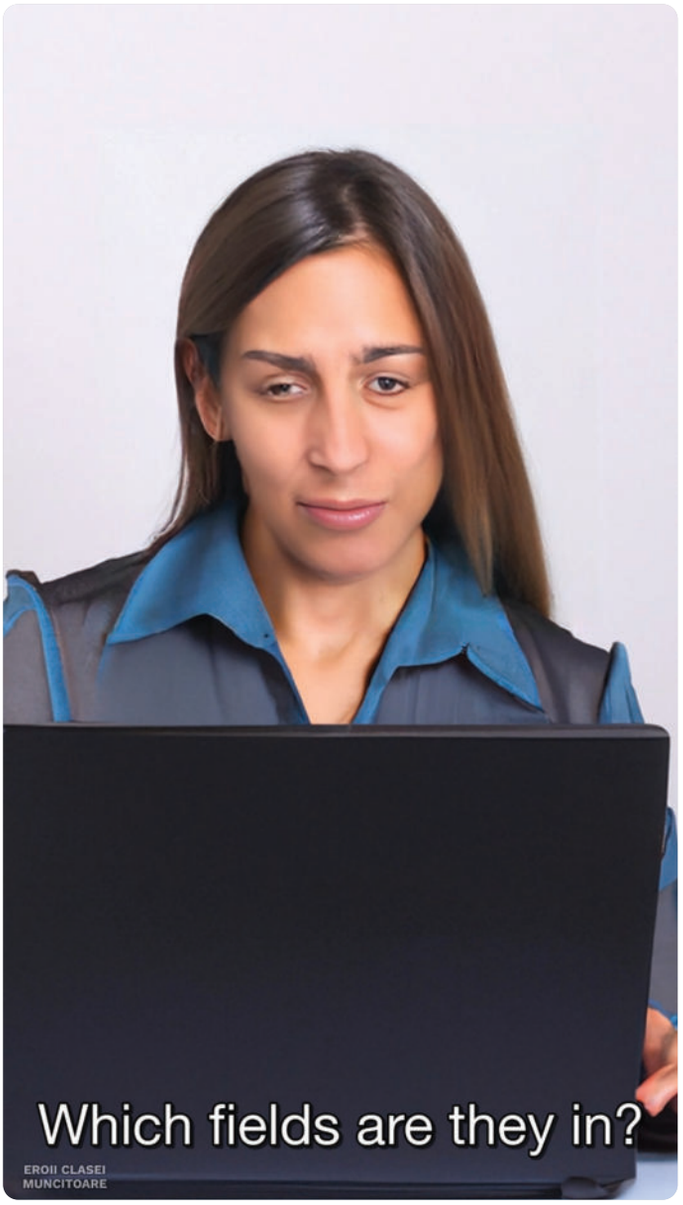
Alina Lupu

PROJECT 07.09.2023

While Timișoara's economy rises and falls on the back of its industry and its workers, how the city is experienced is often on the handiwork of service industry workers who receive the minimum wage. Romania's 2023 minimum wage is 3,000 lei gross, 1,898 lei net, yet a liveable income is estimated at 3,275 lei.

'Working Class Hero' probes Timișoara's minimum wage dynamic, examining its recipients' lives, the support systems they rely on, and their role in the city. The project features the stories of five archetypal minimum wage earners—the waitress, the cashier, the supermarket worker, the museum attendant, and the self-employed starter.

Based on interviews and studies, the stories are fictionalised to protect identities and emphasise them as indicative of shared experiences. By partly developing the narratives and characters using AI tools, the project hints at the potential automation of these jobs. This not only raises financial concerns for the workers, but highlights the potential impact of a human-less service sector on Timișoara's identity.



Alina Lupu was born and raised in Romania, and works as a writer and post-conceptual artist in Amsterdam, The Netherlands. Her work is concerned with the conditions for participation in the economy.


She doesn't plan to stay
in this profession forever.
EROII CLASEI
MUNCITOARE

Credits
Thank you to the interviewees that granted their time.
Audio recording support: Jörn Nettingsmeier.
Composite images generated through DALL-E and videos generated through D-ID.

Data Sources
Guga, Stefan. 2021. 'Minimum Salary and Minimum Decent Living—From Myths to Opportunities.'
Government of Romania, 2019. 'Impact Analysis Regarding the Guaranteed Minimum Gross Salary in Payment for the Year 2020.'

7. Education

Bridging the Space between Institutions, Disciplines and Pedagogies

INSIGHT 20.09.2023

The necessity to connect the designers and architects of tomorrow with the pressing challenges of today was the core motivation of the Bright Cityscapes pedagogical framework: the Atlas of Distances workshop and exhibition. It was the result of a dynamic collaboration and exchange between three diverse institutions, their educators, and their students: The Faculty of Architecture and Urban Studies at the Politehnica University of Timișoara (Romania), Studio Technogeographies at Design Academy, Eindhoven (Netherlands), and Borders & Territories at TU Delft (Netherlands). Here, the educators reflect on the different pedagogical strategies that each institution brought to the collaboration.

Borders & Territories: Architecture as ampersand

Recognising architecture as a binding force that connects divergent aspects, recognises architecture's ability to create frameworks for action. The Borders & Territories course at TU Delft, Faculty of Architecture, investigates spatial bordering practices in emerging territories. It focuses on the critical relationship between architectural theory, spatial analysis, and architectural design; it balances practice and theory, research and design. Lecturer and researcher Negar Sanaan Bensi outlines the pedagogical principles that Borders & Territories contributed to the Atlas of Distances educational collaboration.

Through the studio work, the course attempts to emphasise the range of possibilities that the profound discipline of architecture still entails. To do this, we embrace uncertainty. Our work is geared towards intensifying rather than eradicating the inherent problems within architecture. Instead of presenting set answers, the emphasis of the course lies in asking students to pose questions, and prompting introspection into the very essence of architecture.

We don't focus on architecture's reflective or reflexive character—that is to say the fictive objective in search of a resolution—but on its agency, or its generative and projective potential. This is due to the belief that the true value of architecture is not located in the certainty embedded in its formulated answers, but in the uncertainty implied by its posing of sublime questions.

The ampersand

The concept of the ampersand is a key thematic element and metaphor that informs our pedagogical approach. Through the analogy of the ampersand, architecture can be likened to a binding force that connects divergent aspects. By looking at architecture through this lens, we invite our students to challenge traditional norms and move away from conventional views. Instead, the blending of design theories, scales, and spaces is emphasised. This approach underscores the inextricable ties between the natural and the constructed while also exploring the possibility of architectural independence where traditional norms are continually redefined and diversified.

Challenging times

A number of pressing challenges and considerations underpin architectural production today. There is, therefore, a need to navigate the intricate landscape of architectural outputs and address the fragmented nature of this multifaceted discipline.

This raises the question of how to construct a coherent architectural research programme in contemporary times, one that confronts the inherent challenges of the discipline. These include the ever-expanding scope of an architect's tasks; the interplay between theory and design; the rise of research as a distinct facet of architectural production; and the complexities of modern urban environments.

Considerations such as these create a need to strategically utilise tools and techniques that can translate work from research to architectural design itself. This shapes our studio's methodological approach, influencing both group activities and individual endeavours like PhD researches and Master graduation studio projects.

Complex themes

Four dominant themes structure our work:

- **Border Conditions and 'Spaces of Conflict':** Examining the role of borders amid conflict zones, and understanding migration-related challenges.
- **Architecture, Territory, and 'Infrastructure Things':** Scrutinising the contextual and material foundations

of architectural constructs and perceiving them as territorial entities.
- **Disciplinary Boundaries and Architectural Adjacencies:** A discourse on the defined boundaries of architecture and the potential transgressions beyond those limits.
- **Design Operations and Instruments or 'Modi Operandi':** Speculative and practical research on drawing, and on advanced inventive techniques as the basis for architectural formulation.

These themes are inseparable from the need for pedagogical activism in architectural education, which can serve as a form of action or activation, a method of divergence or a mode of protest. This need challenges both educators and students to step outside of the conventional bounds of their medium, prompting deeper reflections on the condition and purpose of architecture in today's context.

Borders & Territories poses the question: 'How can we create a framework for action?'

Or, as Daniel Libeskind once said: 'Architecture as taught and practised today is but a grammatical fiction... Neither teachers nor students are today encouraged to undertake an adventure—dangerous, risky, perhaps hopeful?—which understands itself as a search for the whence, the whereto, and the why of our architecture's condition: a quest for the miracle, or at least the abyss which illuminates it.'

Studio Technogeographies: Design as engagement

A consistent methodology based on engagement, positionality, and sensemaking is based on recognising design as a mediation between humans and their environments. The Studio Technogeographies course at Design Academy Eindhoven boldly positions complex global systems at the core of design education, bridging the gap between extraction, transportation, manufacturing, commerce, consumption, and geopolitical forces, both human and non-human. Studio leader and Bright Cityscapes curator Martina Muzi, and studio tutor Roberto Pérez Gayo reflect on the pedagogical principles that Technogeographies contributed to the 'Atlas of Distances' educational collaboration.

The name of the studio, 'technogeographies', isn't our invention. It's a term used in anthropology to describe how environments and human-made industries are mediated by technologies and technological practices. We came across 'technogeographies' while looking for a term to foreground and emphasise the relational and mediatory capacities of design, rather than its outcomes or results.

One of the defining principles in Studio Technogeographies is approaching reality as composed of complex and interelated technological systems across multiple scales, spanning from individual bodies to vast systems. This layered approach to technology shapes not only our perspective, but our overall methodology. Every semester, the methodology remains the same, but the studio introduces a new theme, inviting students to apply the methodology to explore varied subjects.

For the studio, activism is about creating conditions for students to experiment and engage with alternate forms of working and collectivity. This includes three approaches:

Design as engagement
The fundamental question we grapple with is: 'how do we engage?' What tools, strategies, and perspectives do we adopt to ensure that our engagement becomes an intrinsic part of the research process?

Design is seen not just as a product but as a method of engagement, entailing research and active involvement. The act of researching is inextricable from making, conversing, and collaborating.

In the programme, we stress that research isn't isolated from making, collecting, or conversing. It's a continuous process, starting from the initial assignment and realising that the process never ends. This interconnectedness of research, making, experimentation, and dialogue inherently embodies activism as a form of activation.

Positionality in design
This is the exercise of understanding and acknowledging one's place within a specific context. This can relate to social positions, power dynamics, and technological association, with emphasis on the ethical and political dimensions of such engagements.

Our approach emphasises engaging with specific systems and materials, not just in broad terms but in understanding our particular connection to them. This forces us to consider our position, especially where power imbalances exist. It challenges us to reflect on the ethical and political dimensions of our actions. Furthermore, it begs the question of how we navigate when we're an integral part of these systems, rather than just external observers.

Sensing and making sense
This approach delves into the aesthetics and material elements of activism, emphasising the importance of experiencing, sensing, and deriving meaning.

This concept is something we've been exploring semester after semester. For example, in this past semester, we emphasised placing experience at the forefront of design. When tackling complex realities, the challenge is to truly understand them without narrowing the gap between our personal experiences and the subjects we wish to connect with.

When we ask our students to immerse themselves in the research, drawing from their lived experiences and

perceptions, we challenge traditional boundaries of external research. How do we reconcile these varied ways of knowing without resorting to homogenisation? What does it truly mean to live and embrace difference?

Understanding and valuing diversity is central to our approach, encapsulating the challenge we pose in our students' work, and our approach to pedagogical activism. As such, the studio promotes both individual and collective learning. While each student is encouraged to develop their own projects and insights, they are also urged to engage in collective discussions and share perspectives.

A recurrent theme in our philosophy is 'alone we can't, but in proximity we can'. This emphasises the power of collaboration without sacrificing individuality.

Faculty of Architecture and Urban Studies, UPT: Adopting a studio mindset

How can an established academic faculty adopt a studio mindset to explore new terrain and strategies pedagogically? The Faculty of Architecture and Urban Planning at the Politehnica University of Timișoara (UPT) is a cornerstone of the Romanian architectural education landscape. It offers a course that strives to promote a forward-thinking approach, marked by innovative teaching methods and progressive discourse. Here Cristian Blidariu, head of the faculty, reflects on the remarkable challenge and opportunity to experiment with a completely novel educational approach for the university, afforded by the Atlas of Distances collaboration.

Firstly, the Faculty of Architecture and Urban Studies at UPT is not a studio and does not have as finessed a trajectory as our collaborators Borders & Territories, and Technogeographies. However, this was precisely the opportunity that participating in the Atlas of Distances educational programme offered us: the possibility to explore and cultivate an active studio mindset. We embraced this with the intention of bringing about transformative changes in the school's future educational strategies.

What we tried to do is to create an alternative studio within the Faculty's regular curriculum, by first opening a call to lecturers who were interested in the themes of Bright Cityscapes. We then invited students from various academic years to participate. This novel approach of amalgamating third, fourth, and fifth-year students not only offered diverse perspectives, but also invited these students to learn through peer-to-peer engagement. The third new approach was to embark on this journey without a clear theme or outcome, but simply by aligning ourselves with the other schools through pedagogies and keywords, and allowing the project to emerge through the journey.

Our students are not international but mostly from Romania. This meant that we needed to consider 'distance' on a scale and context that was relatable to them. The studio also still needed to address certain formal teaching objectives. To resolve this, we structured the studio around the geographical scale of the industry in Timișoara. Students navigated the complexities of the city's geographical and historical context, concentrating on understanding the role of industry in shaping spatial dynamics. The Bright Cityscapes commissioned research by Norbert Petrovici, published in the report 'Economy in Timișoara: Territorial Distribution of the Economy in the Timișoara Metropolitan Area', which demonstrates how the city has become an industrial powerhouse in Romania and the broader European region, played a foundational role in the studio.

Students embarked on an exploratory journey, dissecting the transformation of socialist industrial platforms over the years. While vast sections are transitioning into living spaces, others remain firmly rooted in production. There is a tension between these production and residential spaces, a palpable disconnect. By confronting this dissonance head-on, we avoid spiralling into a fuzzy spatial logic that blurs the identity and functionality of this pivotal city sector. The projects address the city's spatial disconnection, to prevent this loss of clarity and identity in these areas.

Venturing into the interplay between industry and its spatial environments through the studio was pioneering for our architecture school. The projects we facilitated delved deeply into the complexities of distance, scale, and the confluence of production and habitation in urban landscapes.

What our studio undertook was truly exploratory in nature, and it was critical that the students retain their autonomy. They didn't merely follow a dictated path but instead formed their own teams, setting the stage for an experience where the design process was as much about community as it was about individual creativity.

One team's project focused on the Continental Plant area, exemplifying our studio's approach by identifying underutilised spaces, understanding their limitations, and then conceiving sustainable solutions. Nature's integration with the built environment became a central theme. Notably, their perspective on architecture extended beyond aesthetics to encompass functionality. The depth of our students' investigation was admirable. They initiated their design processes by immersing themselves in the site, employing varied observational techniques, from drone surveys to on-foot explorations. This holistic approach was evident when students investigated land ownership and urban regulations, aiming to craft designs rooted in reality.

Beyond the tangible architectural projects that resulted from our method, the studio experience served as a platform for students to learn from each other, fostering a rich environment of shared insights. Their approach

to projects, shaped by personal lenses, showcased the power of individual perspectives in collective endeavours. Within the context of UPT's work, the studio is testament to how pedagogical activism is about introducing flexibility into an otherwise rigid academic structure, about striving to break boundaries within academia. This constructed a bold new experience for the students.

Workshop of Distances

WORKSHOP 15.05–19.05.2023

What's the length of a piece of string? In May 2023, a Timișoara workshop brought together tutors and students from three design departments to explore distance and all its diverse dimensions. Participants examined how it serves as both an objective measure and a subjective influence, affecting perspectives, tools, interactions, geographies, and communities. This exploration led to the development of shared exercises centred around the concept of an atlas, encouraging students to reflect on their experiences.

Following the workshop, an open call invited students to pitch projects for an exhibition. Nine projects, each offering a unique take on the concept of distance, were selected for the *Atlas of Distances* exhibition, which ran from September 22 to November 4 at ARChA, the new space dedicated to UPT's Faculty of Architecture and Urban Planning. Additionally, all workshop-generated projects were presented in poster format during the exhibition.

During the workshop, working with students of different backgrounds helped me see my project in a new light. Their views provided a fresh perspective on my research topic and introduced new approaches. This was very useful, since our project in Northern Norway addresses a site that is not only rich in topography but also politically intricate, given its history as an old mine. Our focus on deep mapping became even clearer through this collective experience.
—**Ana Mendica**, Borders & Territories from TU Delft (NL)

During the workshop, I found it insightful to interact with students from three different universities, each at different stages in their projects—some just beginning, others progressing, and a few nearly finishing. Exchanging insights and viewing each other's contributions, particularly through the lens of Timișoara, provided a new perspective on our own projects and findings. In particular, our trip along the Bega River, combined with an on-boat mini-workshop that I did with a student from Timișoara, gave me a fresh viewpoint on my research project, surrounding the importance of looking into specific linear paths.
—**Dinu Hoinârescu**, Borders & Territories from TU Delft (NL)

My research project is about exploring how wind interacts with objects, infrastructure, and architecture. The new culture, topography, and architectural style I encountered during the workshop in Timișoara provided a fresh context for my exploration. I learned about the industrialisation of the city and how the landscape changed over time. Seeing buildings and infrastructure at different stages was really interesting. On our walks from the outskirts to the city centre, we could clearly see this evolution, and it was quite an experience to witness it. Through the workshop, I believe my perspective will broaden, especially in terms of understanding and engaging with different infrastructures.
—**Richard Kingston**, Studio Technogeographies from Design Academy Eindhoven (NL)

My focus is on weather finance, and I have been mapping the systems surrounding the weather industry in Australia, which involves insurance and financial flows. This workshop has enriched that exploration. During the workshop, my project's direction evolved, especially in how I increased my ability to frame it academically. Collaborating with students of different outlooks influenced my approach.
—**Victoire Coustilieres**, Studio Technogeographies from Design Academy Eindhoven (NL)

The main focus of my project is sound. Through the workshop, it has come a long way; looking at it with fresh eyes has been really helpful. It's made me think about small tweaks or improvements to make it even better. Even though I'm from Timișoara, during the workshop I was genuinely surprised by the richness of the city, especially the natural areas around the river. We explored the city on foot and later by boat, which gave us a chance to experience the different environments it offers. Observing the local activities and places, like where people hang out or the greenhouses, was very interesting. For me, that was the highlight of the entire experience.
—**Sebastian Sgârciu**, Faculty of Architecture at University Politehnica of Timișoara (RO)

During the workshop in Timișoara, I saw the city through a new lens. This experience gave me a fresh perspective, and when moving forward with my project, I will pay more attention to the details that I might have previously overlooked. My project revolves around developing a large park within an industrial zone in Timișoara to make a strong statement about the importance of sustainability. The workshop has emphasised how it is vital to use sustainable resources, like wood, and to consider modular structures. This approach allows for buildings to be repeatedly repurposed and adjusted as needed.
—**Georgea-Elena Ştefan**, Faculty of Architecture at Technical University of Timișoara (RO)

Credits
Photographic documentation: Anwyn Howarth

Alternative Pedagogies: On Fostering Freedom and Agency

DISCUSSION 23.09.2023

The Atlas of Distances workshop enabled an exchange of pedagogical methods among three design studios from three design and architecture schools, creating a fertile testing ground for the development of alternative pedagogies. As the following dialogue underscores, this approach centred on promoting experimentation among students, challenging disciplinary conventions, and embracing various forms of diversity within a framework of structured freedom and student agency.

The dialogue is an edited transcript of the panel discussion that took place during the Pedagogical Activism and Cultural Geographies Conference held at the Polytechnic University of Timișoara on 23 September 2023. It featured Loredana Gaiță (Bright Cityscapes coordinator, and architect, urban researcher, and lecturer at the Faculty of Architecture and Urban Planning, UPT), Cristian Blidariu (head of department, Faculty of Architecture and Urban Planning, UPT), Martina Muzi (Bright Cityscapes curator, and studio leader of Studio Technogeographies at Design Academy Eindhoven), Roberto Pérez Gayo (social designer, researcher, and educator at Studio Technogeographies at Design Academy Eindhoven), and Negar Sanaan Bensi (lecturer and researcher in the Borders & Territories studio, TU Delft).

Loredana Gaiță The Atlas of Distances programme invited three design departments from three schools to collectively develop educational and design strategies for working with cultural geographies and shared spaces. What were the diverse viewpoints and approaches that you all brought to the workshop, which initiated the process?

Martina Muzi As curator of the Atlas of Distances programme, I wanted to bring together various approaches to address the primary challenge of working across individual and institutional boundaries.

From my role as leader of Studio Technogeographies at Design Academy Eindhoven, this entailed broadening the scope of classroom activities and amplifying their reach in order to encompass other institutions, and the wide array of perspectives presented by the 54 students and eight tutors actively participating in the initiative.

Roberto Pérez Gayo In addition to the expansion of the group's size, the challenge of the Atlas of Distances workshop involved the creation of a system capable of accommodating diverse values, priorities, and individual trajectories. To facilitate this, we adopted an activist approach, departing radically from the limited idea of individuality. Rather, we aimed to establish conditions that would highlight differences and allow for negotiation, and the use of these relational processes as a foundation for knowledge generation. This was integral to respecting each school's approach, while also fostering a dynamic, ever-evolving space that encompassed every aspect of the workshop. It was about being honest about our achievable goals, while preserving the value of each school's contributions and creating a complex, fluid environment in continuous negotiation.

Negar Sanaan Bensi In the workshops, we tried to encourage embracing the continually expanding realm of architecture. Students were supported in confronting the inherent uncertainty in their field. Having myself travelled the academic path from master's student to PhD candidate and now tutor, I can advocate for the value of finding one's place in this realm of uncertainty and perpetual evolution. In this pedagogical approach, nothing is taken for granted; instead, everything is subjected to reevaluation and reconsideration. Traditional paradigms, such as the simplistic figure-ground representation of cities, are no longer sufficient to grasp the intricacies of contemporary urban environments.

The Atlas of Distances workshop provided students with opportunities to gain fresh perspectives. Through exercises like urban walks and workshops, students saw beyond the narrow confines of architectural conventions. By doing this, they developed a more nuanced and holistic understanding of the built environment. The workshop also placed significant emphasis on understanding what constitutes the collective, and how this intersects with and complements individual endeavours. This emphasises the importance of collective efforts in architectural education and practice, fostering a dynamic interplay between collective and individual work.

LG Novel design and research methodologies increasingly play a crucial role in design and architecture. A lot of traditional education however still prioritises the

end product. What are some of the alternative pedagogies that you use to stimulate students in developing radical practices?

NSB Methodology is not a pre-given recipe. It's something that is very much related to content. It's a procedural and dynamic method that gives weight to experimentation, especially in an educational setting. It's important to dare our students to experiment and to find a position. This is evident in one of the central teaching methods for Borders & Territories—the act of mapping. This is not just cartographic tracing, but it is intertwined with the idea of activism as a mode of activation of those aspects and dimensions that often remain invisible and marginalised. The act can also be understood as a process of counter-mapping, establishing alternative relationships within a certain territory. A major challenge in design education is also facilitating the transition from research to design. Our students undergo intensive workshops where they translate two-dimensional concepts to three-dimensional thinking in an iterative process that ensures that individual interests are materialised and spatialised.

Cristian Blidariu I'd like to mention the pedagogical method of placing students in unfamiliar or uncomfortable environments. In a particular exercise, students were assigned a specific industrial area with minimal instruction, and were directed to explore and gather as much information as possible, unaware of its eventual application. This unconventional method, juxtaposed against the norm of assigning sites with aesthetic potential, immersed students into a world that might seem devoid of architectural quality. But the underlying lesson is to discern and discover quality in unexpected places. This hands-on approach pushed students to confront preconceived notions, and challenges them to find potential in seemingly mundane or challenging environments.

MM The essence of the studio's pedagogy revolves around interconnecting various systems and aspects, fostering diverse learning experiences. When speaking about methodology inside our studio there are two moments to look at: while preparing the semester and during the semester. First, there is the composition of the studio's pedagogical strategy, which involves crafting steps along the year, considering learning objectives. and inviting tutors. The combination of the tutors' approaches, expertises and practices shapes the overarching studio methodology. Second, inside the studio we encourage each student to test, experiment, and find their own individual methodology of research, engagement, and making. These moments encapsulate the process of designing a pedagogical programme and keeping it flexible in the classroom. The evolution of the semester becomes a collaborative effort between tutors and students, both playing a central role in shaping the process. This makes the methodology of the studio not static but a continued experimentation around a shared vision of design.

RPG There is a necessity to recognise a wider spectrum of knowledge, experiences and individual positions in shaping an educational methodology. Education's primary concern shouldn't just be about selecting specific types of information and topics, but rather it should examine these types of information and engage with them, taking into account various conditions, be they evidential, result-oriented, or actionable insights.

This is why, instead of placing methodology at the forefront, we suggest a more radical approach; that is, simply, starting with the student's experiences. This promotes reflexivity, encouraging students to constantly introspect about their positions and urgencies. By delving into the effects and ethical nuances of our interactions with other individuals, spaces, technologies or knowledges, our intent is to create the conditions for the continuous development of pedagogical methodologies characterised by diversity, hybridity and exchange.

MM For me, the beauty of this collaboration between the three design studios is bringing together the diverse goals and different methodologies of the studios. This is really thanks to the freedom and experiences of the tutors. Every tutor brought a unique experience and clarity to the workshop, regardless of their age, practice typology, or tutoring experience.

NSB I agree with Martina about the importance of diversification. It's important for students to identify themselves based on what they resonate with or reject. There should be no issues around peoples' differences or oppositions—diversity should be thoroughly embraced with all the complexity that it brings forward to become productive. Students need a range of options to find and position themselves.

CB The experimental partnership we embarked on for this project aimed to change the school's traditional teaching approach. Instead of set programs, students could choose their project's scale and focus, and it's thanks to supportive colleagues that we were able to introduce this flexible method.

LG It is notable that across all your diverse perspectives and approaches, two key components seem consistent elements, which might lie at the heart of the Atlas of Distances collaborations. Firstly, there's the need for structured freedom in the educational process, allowing students to operate within a defined framework, yet with significant autonomy. Secondly, there's the concept of 'student agency', emphasising the importance of giving students responsibility, and empowering them to push boundaries.

8. Atlas of Distances

Atlas of Distances

EVENTS / EXHIBITION 22.09.2023–04.11.2023

Distance, in its many forms and interpretations, serves as both a divider and a connector. It is the unseen thread that weaves through perception, shaping an understanding of space, time, and relationships. The Atlas of Distances exhibition considers the diverse dimensions of distance not only as a physical measurement but also as an intricacy within emotional, cultural, and industrial landscapes. By exploring these qualitative and quantitative aspects of 'distance' through the disciplines of design and architecture, contemporary discourses related to extraction, weather, and industrial cycles are contemplated from the perspective of interconnectedness and separation.

The exhibition stems from an educational collaboration that brought together students from three architecture and design departments across three distinct institutions: the Faculty of Architecture at Politehnica University of Timișoara (RO), Studio Technogeographies from Design Academy Eindhoven (NL), and Borders and Territories from TU Delft (NL). During a workshop held in May in Timișoara, students engaged in a series of collaborative exercises inspired by the concept of an atlas. These exercises centred on common conditions associated with various interpretations of 'distance'—technologies, infrastructures, climates, communities, and knowledge. Various methods of design observation, mapping, and interaction with real data in Timișoara were employed to broaden singular perspectives and address more 'common' and 'interconnected' relationships with living environments.

The nine student projects showcased in the *Atlas of Distances* exhibition were selected through an open call. Additionally, all student projects developed during the course of the collaboration are presented in the exhibition through a poster. The design of the poster installation demonstrates how 'the atlas' functioned as a pedagogical tool in the workshop.

Curator
Martina Muzi

General coordination team
Oana Simionescu (FABER)
Loredana Gaiță (UPT)

Exhibition team
Nicușor Duma
Mihai Moldovan
Bianca Schick
Lorena Brează

Exhibition participants
Laurin Böhm
Anamaria Degău
Louella Exton
Vanessa Heider
Josh Jerome
Richard Temple Kingston
Edward-Stefan Kiss and Denisa-Anamaria Landler
Petar Kukec
Anastasia Stolearenco

Design poster series
Peak15 Design Studio

Editors
Nadine Botha (EN)
Cristina Potra-Mureșan (RO)

Graphic design and platform coding
Kirsten Spruit

Participating schools

Faculty of Architecture and Urban Planning, Politehnica University of Timișoara (UPT)

Tutors
Assoc. prof. Cristian Blidariu (Dean of Faculty)
Assoc. prof. Ana-Maria Branea
Assoc. prof. Marius Găman
Lect. Daniela Negrișanu

Students
Anisa-Rachel Almagattish
Alex-Georgel Ban
Anamaria Degău
Ionuţ-Radu Druţa
Elena Fildan
Răzvan Iliescu
Edward-Ștefan Kiss
Denisa-Anamaria Landler
Silvia-Elena Maxim
Florea Miruna
Eduard Muntean
Mădălina-Melania Nasălean
Cristian Pocitarenco
Nicolae-Daniel Popa
Eliza-Lucia Radu
Maria Radu
Ruxandra Rotar
Sebastian Sgăroiu
Georgea-Elena Ștefan
Anastasia Stolearenco
Doris Teodora
Alexandru-Aurel Tudoroiu
Alexandra-Elena Tuleu
David Unipan

Studio Technogeographies
Design Academy Eindhoven (DAE)

Tutors
Martina Muzi (Studio Leader)
Christoph Miler
Roberto Perez Gayo

Students
Shira Arzi
Hui Baquero
Laurin Böhm
Victoire Coustilieres
Ralph Diepstraten
Mari Ebisu
Louella Exton
Anwyn Glenys Howarth
Marie de Lavergne de Cerval
Vall Loucas Chabot
Eve Peng
Sterre Rosmalen
Maya Stimpfl
Richard Temple Kingston

Borders & Territories (B&T), Faculty of Architecture Delft University ofTechnology (TUD)

Tutors
Assoc. prof. Marc Schoonderbeek (Program Director)
Lect. Negar Sanaan Bensi
Stefan Gzyl

Students
Mathilde Barth
Bart Claver
Dinu Hoinărescu
Josh Jerome
Vanessa Heider
Dominika Kubicka
Petar Kukec
Savvina Megalovasili
Ana Mendica
Małgorzata Łysik
Julia Pałęga
Joanna Pilecka
Tatsumi Sone
Kamil Urban
Mia Vrgoč
Luisa Zeilinger

The Atlas of Distances Workshop

POSTER SERIES 22.09.2023

The Atlas of Distances Workshop, held from May 15 to 19, was conceived as a week-long immersive experience that alternated moments of observation and mapping with moments of organisation and design. Throughout this period, students developed individual projects through the multifaceted lens of ‘distance’, understood to encompass communities, infrastructures, weather and climate, resources, and technologies.

The very workshop space itself served as ‘the atlas’. Initially, it was a blank canvas, characterised by two primary axes: time and altitude. As each day unfolded, students evolved their projects through layering, expanding, visualising, materialising, manifesting, connecting, editing, and navigating. Various visualisation and materialisation techniques, including 2D, 3D, and time-based media, were used to bring these projects to life. By the workshop’s culmination, each project had found its place within ‘the atlas’, accompanied by a set of keywords.

The collection of posters presented here represents a redesigned three-dimensional publication of the atlas of individual projects. Each student’s work demonstrates a distinct exploration of ‘distance’, whether viewed as an objective or subjective facet of design and architecture. These projects are conveyed on posters through images, unaltered student notes, and keywords, which facilitate navigating the projects’ intentions.

The graphic design system developed for this purpose serves as an archival and indexing tool, maintaining a consistent framework for organising the projects. This system aligns with the conditions and atlas employed during the workshop. These conditions, in turn, categorise the projects in relation to design and architecture discourse relating to industrial cycles, weather phenomena, and resource extractions.

Credits
Posters Design: Peak15 Design Studio

Faculty of Architecture and Urban Planning,
Politehnica University of Timișoara (UPT)

Tutors
Assoc. prof. Cristian Blidariu (Dean of Faculty)
Assoc. prof. Ana-Maria Branea
Assoc. prof. Marius Găman
Lect. Daniela Negrișanu

Students
Anisa-Rachel Almagattish, Alex-Georgel Ban, Anamaria Degău, Ionuţ-Radu Druţa, Elena Fildan, Răzvan Iliescu, Edward-Ștefan Kiss, Denisa-Anamaria Landler, Silvia-Elena Maxim, Florea Miruna, Eduard Muntean, Mădălina-Melania Nasălean, Cristian Pocitarenco, Nicolae-Daniel Popa, Eliza-Lucia Radu, Maria Radu, Ruxandra Rotar, Sebastian Sgăroiu, Georgea-Elena Ștefan, Anastasia Stolearenco, Doris Teodora, Alexandru-Aurel Tudoroiu, Alexandra-Elena Tuleu, David Unipan

Studio Technogeographies
Design Academy Eindhoven (DAE)

Tutors
Martina Muzi (Studio Leader)
Christoph Miler
Roberto Perez Gayo

Students
Shira Arzi, Hui Baquero, Laurin Böhm, Victoire Coustilieres, Ralph Diepstraten, Mari Ebisu, Louella Exton, Anwyn Glenys Howarth, Marie de Lavergne de Cerval, Vall Loucas Chabot, Eve Peng, Sterre Rosmalen, Maya Stimpfl, Richard Temple Kingston

Borders & Territories (B&T), Faculty of Architecture
Delft University ofTechnology (TUD)

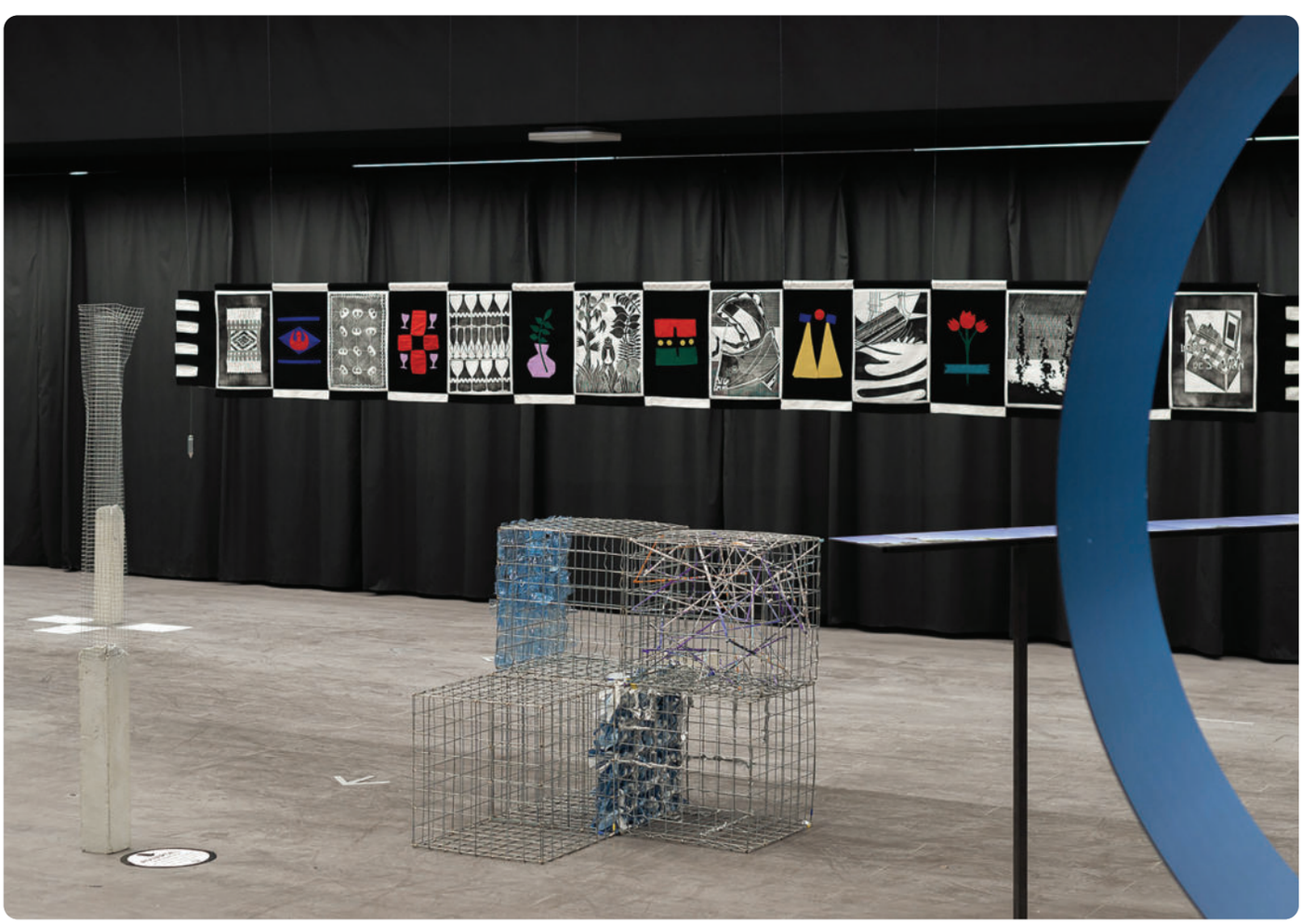
Tutors
Assoc. prof. Marc Schoonderbeek (Program Director)
Lect. Negar Sanaan Bensi
Stefan Gzyl

Students
Mathilde Barth, Bart Claver, Dinu Hoinărescu, Josh Jerome, Vanessa Heider, Dominika Kubicka, Petar Kukec, Savvina Megalovasili, Ana Mendica, Małgorzata Łysik, Julia Pałęga, Joanna Pilecka, T atsumi Sone, Kamil Urban, Mia Vrgoč, Luisa Zeilinger

Adaptive Reclaim: Modular Transformation

Denisa Landler and Edward Kiss

STUDENT PROJECT 22.09.2023



A revitalisation proposal aims to repurpose an industrial site in Timișoara, Buziașului area, preserving its industrial character while creating a vibrant space that serves both the local community and the broader region. ‘Adaptive Reclaim: Modular Transformation’ is an interactive exhibit mapping the processes behind the development of the proposal.

Initially, the exhibit presents itself as a large cube covered in meshed metal fencing, symbolising the overwhelming scale of the large fenced-up, disused site. Over the course of the exhibition, public interaction gradually breaks down the cube into smaller modules, illustrating how large sites and problems can become manageable through community engagement. These smaller modules reveal various materials and textures, representing untapped resources and potential for retrofitting and recycling. Additionally, some modules vary in weight, representing different levels of complexity.

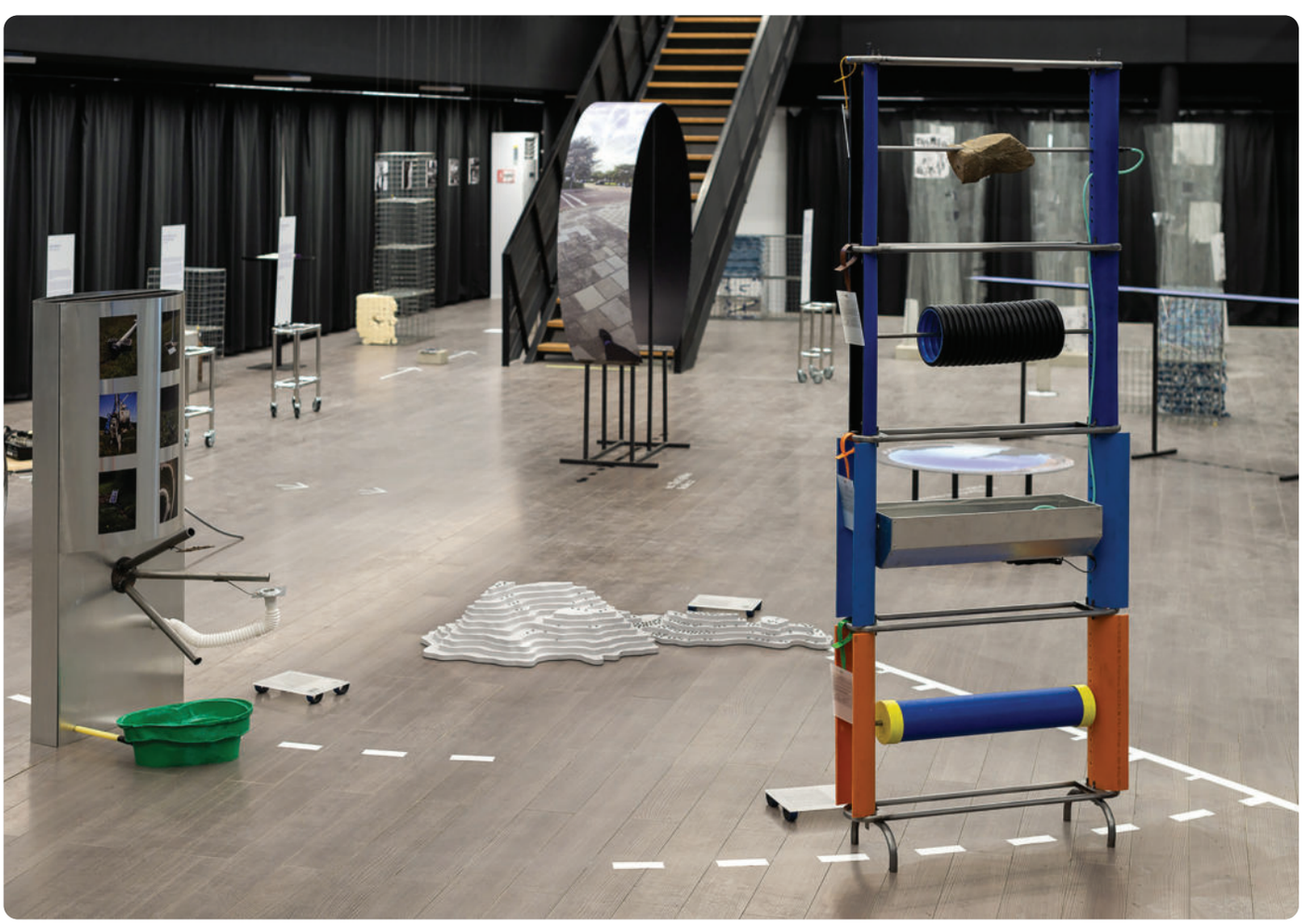
The installation demonstrates design and architecture’s power of breaking down large challenges to a human scale.

Denisa Landler and **Edward Kiss** both grew up in Timișoara, and are now studying architecture at the Politehnica University of Timișoara. Edward’s skills in metal fabrication, and Denisa’s experience with community projects, make for a complementary collaboration.

Artificial Snow

Laurin Böhm

STUDENT PROJECT 22.09.2023



In Austria, heavy reliance on winter sports has resulted in a mono-industry, exclusively driving public interest in this sector. Climate change, however, has led to fewer snowy winters, resulting in investments in industrially manufactured artificial snow. Despite being portrayed as a natural process, the system consumes a staggering 16 trillion litres of drinking water, with 40% lost during the snowmaking process alone. It also alters natural water paths, diverting resources during times of scarcity. These swift construction projects, driven by public interest, are harming the Alpine ecosystem for short-term gains.

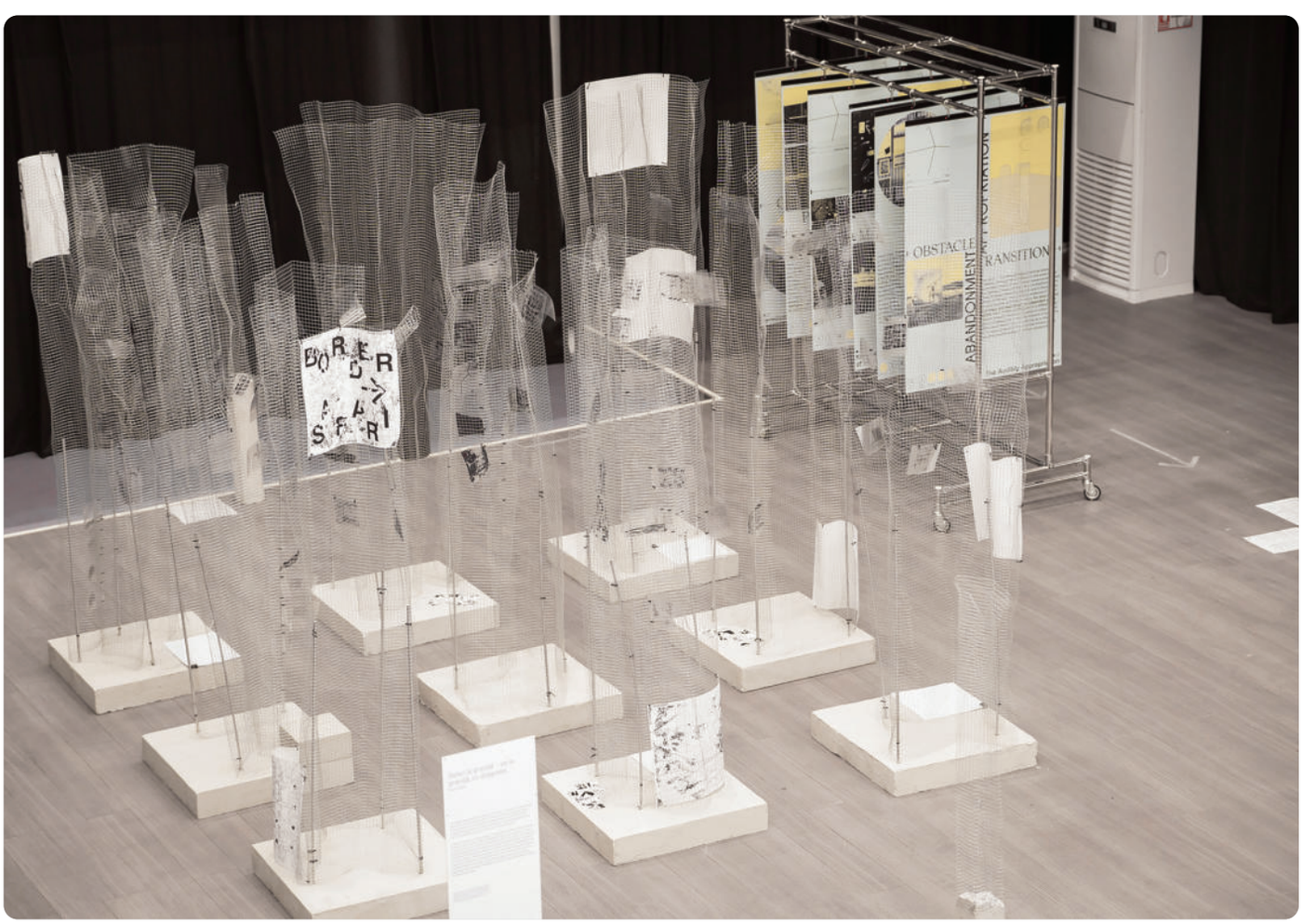
‘Artificial Snow’ features three objects illustrating the absurdity of these systems across different scales. Vertically, the objects illustrate rising economic value, driven by the systems and water they contain. Horizontally, they depict the repetition and accumulation of elements and systems.

Laurin Böhm was raised in an Alpine region of southernmost Germany and is currently a member of the Technogeographies Studio at the Design Academy Eindhoven. She has a penchant for working in the social sphere, transforming observations and research into tangible forms of engagement.

Border Safari, from the Border with Love

Petar Kukec

STUDENT PROJECT 22.09.2023



The concept of borders is rich in synonyms—frontier, boundary, partition, borderline, dividing line, perimeter, marches, bounds, and more. As numerous as the nouns to describe this phenomenon are, there are even more forces influencing their shape, from human actions to environmental and philosophical factors.

‘Border Safari, from the Border with Love’ presents an architectural materialisation of the entanglement and diversity of the complex elusive concept. It employs various mediums that, depending on one’s proximity to the border, evoke different atmospheres, prompting questioning the frontier’s mental essence as well as its existence in time and space. Thus travelling in both the physical and metaphysical realms, the ultimate destination is a border territorial billboard. This glitch-like element challenges the perceived strength of the infamous yet almost non-existent border between Norway and Russia in the material world

Petar Kukec was born in Croatia and is currently pursuing a Master of Architecture, Urbanism, and Building Sciences at the Technical University of Delft. His interests encompass the interconnections between landscape, society, and political ideologies.

Catch Wind of

Richard Temple Kingston

STUDENT PROJECT 22.09.2023

Wind harps rely on a seldom-appreciated facet of the wind: its resonance. The resonant quality of the wind can lead to power lines emitting a hum or even contribute to the collapse of bridges. In the case of wind harps, it sets the strings in motion, giving rise to harmonics.

Offering a sense of the wind's behaviour in the vicinity of this exhibition, the sound being heard is live from the contact mics attached to a wind harp on the rooftop of this building. The wind harp has strings extending in four directions, with each string resonating most intensely when the wind flows perpendicularly to it. Higher notes signify greater speeds.

By transforming the motion of the wind into an ethereal language, 'Catch Wind of' brings a natural force closer through an experience that is not only meant to be heard but also savoured.

Richard Temple Kingston is a Canadian student in the Technogeographies Studio at Design Academy Eindhoven. Leveraging his background in political science, music, and industrial design, his practice aims to broaden the collective imagination.

Credits
Coding assistance: Engr. Asfandiar Ayub

How to Fall in Love with a Contrail

Louella Exton

STUDENT PROJECT 22.09.2023

Contrail clouds, short for ‘condensation trail clouds’, are long, thin, and sometimes wispy cloud-like formations that are formed by water vapour condensing on to the soot particles emitted by aircraft.

‘How to Fall in Love with a Contrail’ is a guidebook outlining a set of observational techniques developed to study these anthropogenic clouds. Going beyond the exercises prescribed in citizen science programmes such as NASA’s Globe, this set of techniques explores novel ways of documenting contrails in order to capture more specific data and create a more intimate practice for the observer.

In addition to the guidebook, three diagrammatic sculptures demonstrate possible outcomes of the techniques, and how adjustments to scale and using the human body in space impact the outcome. The sculptures are testament to a dedicated and obsessive practice based on the belief that these beautiful traces in the sky require more tailored, loving, and attentive approaches to observation.

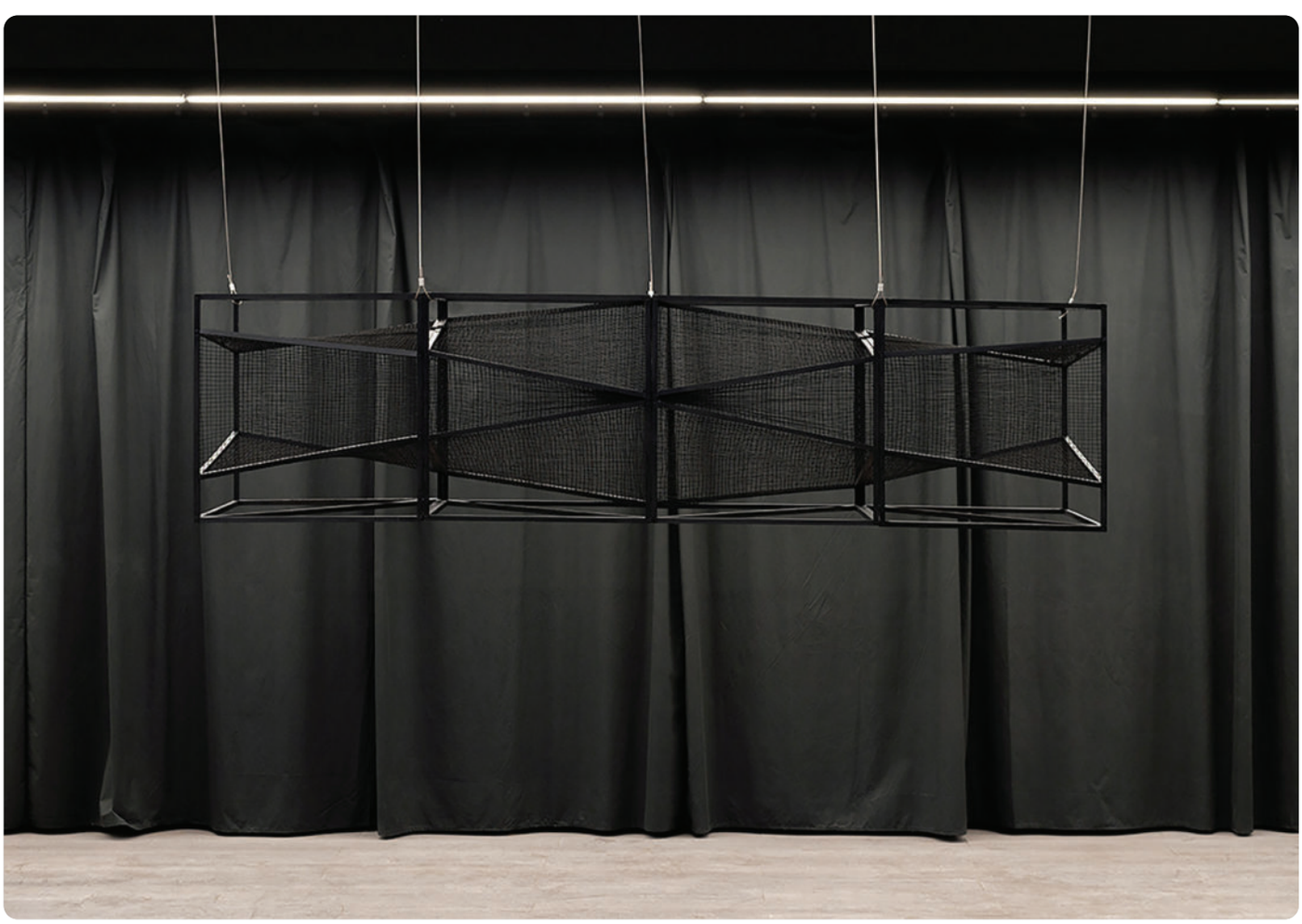
Louella Exton is a Dutch-Australian designer currently part of the TechnoGeographies Studio at the Design Academy Eindhoven. She is motivated by an interest in the material systems that connect people and landscape.

Credits
Publication printing and binding: Buch.One
Metal fabrication: Laurin Böhm and Richard Kingston

Perceiving Distances: Void and Negative Space

Vanessa Heider

STUDENT PROJECT 22.09.2023



The open-pit mine at the Iron Ore Mine in Kirkenes, Norway, intricately carves into the landscape. Within it, distances transcend human scale, eluding precise measurement. Particularly, visual distances may not always align with measured ones. This fascinating phenomenon challenges conventional understanding of negative space, leaving the vast distances concealed within the open-pit mine uncertain, and posing challenges for accurate perception.

‘Perceiving Distances: Void and Negative Space’ explores how to navigate these spatial enigmas. A series of representations of the open-pit mine’s cavity demonstrate the mesmerising illusions posed by this void. An interplay of 2D and 3D visualisation strategies thoughtfully investigate how distances of various scales and proportions can be skillfully manipulated to become perceptible under different conditions.

Vanessa Heider was born in Germany and is currently pursuing a Master of Architecture, Urbanism, and Building Sciences at the Technical University of Delft. To her, architecture is more than a profession; it is a medium for conveying emotions and making bold statements.

Placed

Joshua Jerome

STUDENT PROJECT 22.09.2023

In today’s interconnected world, our lives are intertwined with distant places and people, forging ties with unfamiliar yet influential figures who impact our realities and identities.

‘Placed’ grew from a deeply personal task to produce familiarity into an alien landscape. Through a tactile and iterative process of map-making and data encoding, a tapestry emerges. Stories of unknown individuals, arranged by their proximity to the designer’s life, flow from left to right. Interspersed between these narratives, amalgamated coats of arms bestow identity on the designer’s sense of belonging in the unknown.

The work invites contemplating one’s own placement and proximity within the designer’s web of influence. It also encourages introspection regarding one’s own intricate network of anonymous connections.

Joshua Jerome is a spatial designer from Australia currently pursuing a Master’s degree in Architecture, Urbanism, and Building Sciences at the Technical University of Delft. His practice delves into the psychological, physiological, and behavioural dimensions of architecture.

Postindustrial Living —The Bench

Anamaria Degău

STUDENT PROJECT 22.09.2023

In traditional Romanian villages, the humble bench brings the street to life. Whenever someone takes a moment of rest on the bench, it inevitably invites those passing by to pause and engage in conversation. This remarkable piece of public furniture not only evokes personal memories and anecdotes but also serves as a hub for observation, anticipation, and congregation.

Inspired by the benches found in Hinchiriș, this version lacks a backrest, encouraging people to lean against the supporting wall. The legs are adorned with a variety of traditional shapes and joints, gracefully converging beneath a single seat, symbolising the fusion of old and new.

Similar to its original context, when installed in an exhibition, the bench serves as a communal focal point for visitors. Is it merely a bench, or is it an invitation?

Anamaria Degău is an architecture student from Arad, Romania, currently studying at Politehnica University of Timișoara. Through her work, she aspires to rekindle an appreciation for communal cohabitation and bonds.

The Silent Shadow

Anastasia Stolearenco

Over 50% of women worldwide endure some form of harassment in public spaces, yet many cases go unreported due to the fear of stigmatisation, distrust in the justice system, and potential reprisals. While Romanian legislation offers protection, concrete implementation measures are lacking.

‘The Silent Shadow’ is a series of black-and-white photographs that highlight the various forms of harassment women face in public spaces. Each image represents distinct factors, grounded in real experiences shared by Timișoara’s women with the designer, who also serves as the subject in each photograph to safeguard identities.

Beyond underscoring the need for concrete measures for prevention and destigmatising reporting, this project brings attention to the intangible shadows of fear and mistrust that women carry while navigating public spaces—shadows impossible to quantify, report, or prosecute.

Anastasia Stolearenco hails from the Republic of Moldova and is presently pursuing her studies at the Politehnica University of Timișoara. She is a socially engaged and curious person who is constantly expanding her knowledge.

Credits
Photographer: Iuliana Prisacari
Publication printing and binding: Buch.One
Metal fabrication: Laurin Böhm and Richard Kingston

9. Reflections

The Public as Co-Producer

ESSAY 22.10.2023 TEXT BY MIHAELA TILINCĂ

Coordinator of the Bright Cityscapes mediation programme, Miha Tilinca, reflects on how the exhibitions created surfaces for content and exchange. This offered an opportunity for the public to not only participate and engage with the initiative, but co-produce the exhibitions, influencing their content and energy.

> ‘O expoziție foarte bună cu un concept îndrăzneț. Felicitări!’
>
> ‘I was impressed by the exhibition. Its content and concern for a better future. I hope we are getting to a better future. We should start building it in the present.’
>
> ‘Very good job. Hugs from Cluj.’
>
> ‘Une exposition très intéressante qui mêle histoire, technologie et art. Présentée de manière intelligente. Merci aux personnes qui la présentent, avec compétence et gentillesse.’
>
> ‘I admit that the exhibition is not exactly my cup of tea. But what I did understand I liked!’

Whether I merely transcribe the feedback left by the public, or share the daily observations made by the young team that mediates the two exhibitions showcasing the work and processes behind Bright Cityscapes, or whether I go deeper into analysing practices, discourse, or agency around the programme, the result remains constant: the audiences were open to and intrigued by the opportunity offered to them by the programme, starting with its titles and central themes and continuing with the perspectives, presentation, and modes of engagement they could choose from.

Since this volume is meant to document the programme and offer its stakeholders and readers a snapshot of what the Bright Cityscapes encounter meant for different people and for the city, I am going to shape my reflections

as a 'freeze frame' or snapshot that aligns with one of the principles of good mediation: 'don't tell them, make them feel'. Therefore, I will incorporate many voices and words from different stakeholders and people who engaged with the programme, while signalling some key points regarding mediation and the public that warrant further analysis and discussion.

This text is written while the programme and the two exhibitions emerging from it are still in progress, so it is too early to assess and measure its impact. However, there are two factors which set this programme apart from every other cultural and educational programme happening in Timișoara or at a national level, worth highlighting here. Firstly, Bright Cityscapes is a programme with a progressive and dynamic approach to mediation, thoroughly integrated from conception to implementation. And secondly, the public (all publics) have actively assumed the role of co-producers of content and sponsors of energy for Bright Cityscapes, as envisioned by the core team of the programme.

While examining how Martina Muzi, the curator of the programme and its exhibitions, and the programme team have designed Bright Cityscapes as a programme of, by, and for the public, I will use the working definition from Maria Lind's essay 'Why Mediate Art?' that states that cultural mediation 'is creating surfaces of contact and exchange between audiences, artists and their practices, curated projects, institutions, organisations and cultural spaces and the world in a diversity of forms, rhythms and intensities to provoke questions and dialogues around art, about art, the self, the other and the world'.[1]

Surfaces of contact and exchange

As all the texts in this volume show, Bright Cityscapes has been built as a multi-layered and dynamic surface of contact and exchanges among different professionals and people, among different generations, among different organisations and institutions, among different geographies and histories, among different cultural spaces, and for each of these contact surfaces the curator and her team have thought a multitude of forms, rhythms and intensities in order to provoke curiosity, questions, and dialogue around some of the urgencies of our times—industrial heritage, digitalisation, resources, labour practices, ecology, etc.

What I am saying is that Bright Cityscapes is not only a design programme that draws on research, anthropology and art to provoke discussions about a better and sustainable future and produce change. It is also to some extent itself a state-of-the-art mediation programme that contributes to a new paradigm of how mediation and the public should be seen. In this paradigm, one cannot but recognise 'the public' as pluralistic.

In the particular case of Bright Cityscapes, the public is a

constellation of all the stakeholders of the programme—researchers, designers, academics, industry professionals, cultural managers, mediators, diverse audiences.
In different words and ways, they all speak about how their experience in and around the programme provoked them, led them to unexpected dialogue and discoveries, made them co-producers of new knowledge, and about how transformative Bright Cityscapes has been for who they are and what they do.

Raul Ionel and Jing He, an engineering researcher and a designer respectively, have worked together and explored how they can recontextualise Printed Circuit Board (PCB) manufacturing and the inspection process around it, giving a glimpse into the city's industry. When they speak about the impact their dialogue had on themselves, on the design object, and on the public at large, they mention new perspectives, self-discovery and the creation of new knowledge.

Raul confesses:

> 'I come from a world of electronics, a world that is anchored in standards, in fixed ideas; a world where there are few deviations from the rigour of manufacturing. But our project in the exhibition, these objects from the world of PCBs and inspection processes, are embraced in the colourful light that Jing has brought. Objects with otherwise little prospect of gaining public interest and little chance of triggering emotions, appear to the public in a completely different light because of their design.'

Jing adds:

> 'I tried to find a way to connect this new technology with daily life, because I knew as an outsider how I see this knowledge, this technology. I also wanted to show the audience my feelings and emotions regarding what I have learned—the curiosity, my confusion, and the conflict I noticed between technology and economy.'

The projects in the *Turn Signals—Design is not a Dashboard* exhibition represent such dialogues between technology and design. These collaborative practices that the researchers and designers engaged in, are not only noticed by the audience visiting the exhibition, but they also provoke the public to revisit their own views and knowledge, as the notes on the reflection cards confirm:

> 'The "skeleton" of the machine ["Synthia"] impressed me most because it combines art with technology, offering a new perspective on 'industrial' things.'

> '"Synthia." An interesting combination of design and technology.'

> '"Synthia." It creates a state directly linked to the interaction with her voice, a state that somehow transports you into the madness of life connected to the steering wheel.'

> '"Composition of Stress and Balance N. 1." I was surprised by the association of physics with the emotional and personal balance part.'

When asked about how their exploratory work with the designers and the results of their collaboration will impact their professional practices, the four researchers from the Politehnica University in Timișoara—Cristina-Sorina Stângaciu, Versavia Ancușa, Ioan Both, and Raul Ionel—all said that they will certainly incorporate this perspective into their classes. They plan to integrate the design projects from the exhibition into their presentations, classes, and labs.

Bright Cityscapes' impact extends beyond only the academic researchers. Anastasia is one of the 54 students who participated in the educational strand of the programme—*Atlas of Distances*. She speaks with passion and gratitude when she describes the transformational experience that took her from just seeing the drawing board, to seeing architecture as a social encounter and discovering herself as an activist artist. The *Atlas of Distances* exhibition and the workshop that developed it, are the results of a pedagogical collaboration between the Faculty of Architecture from the Politehnica University of Timișoara (RO), Studio Technogeographies from Design Academy Eindhoven (NL) and Borders & Territories from TU Delft (NL). By employing radical pedagogical approaches, students were guided by artists and teachers in an experiential journey centered around the exploration of distances within the city. This journey led to profound reflections on the urban ecology of Timișoara.

One of the mediators, Maria, remembers that the exhibitions uncovered themselves to her gradually and that even after seeing them daily, her interest and curiosity is still high:

> 'Finding the name in my mind was a whole debate with multiple hypotheses that I couldn't wait to test. At the opening I encountered a space that instantly made an impact—how cool—and the red thread of the story started to connect. Now, although all the works together form a sculptural and interactive atlas of the perception of distances, [I've realised] each work can be a whole atlas, a portal to a world whose facets and depths we keep discovering either through the responses of visitors or through the multiple perspectives I try to have when addressing different audiences.'

The couple of examples discussed above illustrate how through inbuilt attention to dialogue, collaboration and connections, Bright Cityscapes increased the contact surface among a multitude of individual and institutional actors and stakeholders involved in it on different layers, and how these stakeholders and publics perceived their experiences and benefits of being involved in Bright Cityscapes. In what follows I will note figures, profiles, thoughts and notes about and from people who engaged with the programme as members of the audience of the exhibitions *Turn Signals* and *Atlas of Distances*, held at FABER and ARChA at UPT respectively. This set of data

indicates in what ways people have actively assumed the role of co-producers of content and sponsors of energy for Bright Cityscapes.

Co-producers of content and sponsors of energy

In the European Capital of Culture, with tens of exhibitions and cultural events that tempt the citizens of Timișoara and the visiting tourist daily, over 3 500 people visited the two exhibitions in four weeks. Of these visitors, 85% were below 35 years old; the youngest were in kindergarten, the eldest in their 80s. The groups visiting the exhibitions came from schools, universities, companies and the creative industries, and included seniors who retired from factories and industries that no longer exist.

Some of the self-portraits written by visitors, selected from the wall where they became part of the exhibition read:

> 'TC amateur artist and music lover.'
>
> 'CD freshly entered fifth year of architecture at UAUIM.'
>
> 'T curator and cultural manager.'
>
> 'CF MA student University of Oxford, machine learning researcher, part-time tutor.'
>
> 'M currently studying medicine, ex-debater and a very passionate person about human rights, ecology and politics.'
>
> 'AD 30, environmentalist living in London but originally from rural south Germany.'
>
> 'T 11 years old'
>
> 'GC I am passionate about art and support cultural events that take place in Timișoara; I try to attend as many as possible.'
>
> 'A third year student at AC UPT, poet and passionate about relevant and true culture.'
>
> 'R intrigued by innovation.'
>
> 'CO is my name and I like to observe.'

Misa, one of the exhibition mediators, journals her experience with the public:

> 'I like the openness of the public, the positive feedback I received, not necessarily in writing, but it was observable to the naked eye. If many stories are told in exhibitions, by designers, by research engineers, by sociologists and anthropologists, we [the mediators] come with our story. Everyone [who visits and participates in activities] is very open to continue this narrative thread. This amazed me. To have extraordinarily interested second graders, in difficult pieces, in statistics, including Norbert Petrovici's research, it shocked me. Eight-, nine-, ten-year olds are constantly interested in learning from lexicons, from labels, from the texts integrated in works ('Waste Stream') or being interested in the 'Block Networks' project—what are block networks, and how do they connect to their own experience.

The public were drawn to and responded to the unconventional nature of the exhibitions, as well as the unconventional and emotionally charged spaces where the exhibitions were hosted. FABER is a former industrial building, and ARChA is a former university canteen and club, which hold a lot of personal memories for the local visitors, unlike more conventional museum or gallery spaces. They felt, as Muzi and the entire team had anticipated, that these spaces established emotional and strong connections between the concept of the programme—industry as a part of the city's identity—and with the lives of those engaging with the programme. The selected spaces also unexpectedly evoked connections with times, lives, and people from the past.

The exhibition at FABER, for instance, is in the former premises of the AZUR factory. 'I learned from a visitor from Israel, born in Timisoara, that her mother was a doctor, 30 years ago,' wrote mediator Felicia in a note.

Georgiana shared on the mediation group: 'A gentleman came by today to see what the space looks like now. He told me that he was a DJ at the disco before 1989 and told me about the cultural events that took place here, very cool!'

One visitor wrote:

> 'I've only been here for one week… I've seen several abandoned industrial areas [with] some really beautiful, intriguing constructions and shapes [and] lots of questions [about] what was there before, who were the people connected to those places, what happened on a local as well as on a more global scheme… many questions. I'm looking, searching, just observing.'

Visitors made these thoughts, memories, histories, and experiences visible through notes left on reflective cards. Taking inspiration from Nina Simon (the initiator of Museum 2.0 and OFBYFOR ALL) and with the endorsement of Muzi, the active participation of the public took the form of a meticulously designed opportunity, inviting people to contribute and co-create meaning. As a result, within the exhibition, there is a mediation corner, crafted and produced with the same level of care as all the other design elements in the space. This corner is arranged and furnished for moments of sitting and reflection, featuring benches, a table, and a wall adorned with cards bearing thought-provoking questions or notes from previous visitors, waiting to be read or used as platforms for further contributions.

Here the public noted what they liked and why:

> ‘The “skeleton” of the machine [“Synthia”] impressed me most because it combines art with technology, offering a new perspective on “industrial” things.’

> ‘“Working Class Heroes” because it highlights a much-discussed and tabooed issue in the country—pay transparency, and all the pitfalls you go through when you get a job. I think it’s a very important project that should be extended to cover as many jobs as possible and whose message needs to be heard by more people.’

> ‘I found the use of scraps to create lighting objects unusual. I find it a beautiful metaphor that something that was meant to be sturdy has turned into such a diaphanous structure.’

> ‘The light fixtures are brilliant. I enjoy the recycling of existing material.’

The public also expressed their concerns and aspirations:

> ‘“Working Class Heroes”—I wasn’t necessarily surprised, but I’m glad to see artwork that exposes the social and economic inequalities on the ground. Romania is often looked upon favourably in the West because we don’t have a “pay gap” here—indeed, people are paid the same regardless of gender.’

> ‘[Regarding the Bright Cityscapes programme] I find it valuable to collaborate with teenagers. I think it’s an important time in our lives when we need anchors, including related to the space we live in.’

The public offered their take on themes in the exhibitions. For instance, a trigger question, ‘There is an increasing discussion about job automation. What impact do you think digitisation has on your profession?’, provoked the following responses:

> ‘I don’t have a job yet, but I dream of becoming a YouTuber and I think that AI will make the job easier, especially editing.’

> ‘As a future biology teacher or researcher, I don’t think digitisation will change my profession a lot, but I think it will improve it and help us with a bit of inspiration and help for science.’

> ‘I’m more into analogue photography because I think it’s art and you can’t make true art with machines. Also, photos don’t have meaning anymore (because everybody has a phone now.)’

> ‘If there will be machines that can design specific shapes out of stone, the people won’t appreciate the design made with a human hand. A machine makes a perfect imperfection, while a human hand makes an imperfect perfection.’

‘I work in software testing for a bank. We do software automation, but I am hopeful that AI will not take my job in the next 8–10 years. “Digitisation” in my domain is just a means of doing things faster.’

‘I work in the food industry as a quality manager. I expect more manual steps in the preparation of vegetables to be replaced by infrared technology and other new innovations. Simple tasks will diminish in number.’

‘This is an interesting question for people that drive the automation process. As an AI researcher, I can definitely envision major parts of my current work being replaced, particularly data-centred tasks. Some may argue that, one day, A61 may research itself.’

How would the public see the next steps of the programme?

‘Through a book. A book dedicated to the same type of audience. Through an exhibition adapted to the “cultural literacy” level of the “working class heroes”.’

‘I would attempt a documentation of young people’s perception of the city’s industry. There could be two methods, through art students (open call and proposals) and run independent theatre spaces, poetry circles.’‘
‘As a permanent residency for several series of artists exhibiting installations, stories, concepts, making us smarter, more creative and… [more] us.’

‘I’d love to link these great exhibits with a suite of factory visits, continuing the connection.’

‘It would be nice if the exhibition could circulate through factories and companies.’

For a start I would tour this exhibition in other university centres and in parallel I would post a video of the exhibition in online environments!

The response of the public, their contributions, and the openness with which they entered into dialogue, confirm that the programme and the exhibitions have been opportunities for conversations that otherwise would not have happened.

The programme and the exhibitions opened big conversations about where we all have been, where we all are, and especially where we want to go.

Felicia, Georgiana, Maria, and Misa—who are quoted above—are part of the team of ten mediators, along with Anastasia, Elena, Ioana, Karina, Nicoleta, and Tudor. This team is coordinated by Claudia Bucsai, and they collectively facilitated and enriched the public’s experience, within the two exhibitions and the spaces hosting the projects that showcase the findings and results emerging from the programme.

10. Addendum

Excerpt from the ‘Economy in Timișoara: Territorial Distribution of the Economy in the Timișoara Metropolitan Area’ report

Download full report via
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ECONOMY IN TIMIȘOARA:

Territorial Distribution of the Economy in the Timișoara Metropolitan Area

Timișoara’s Thriving Economy in 2022

Extract from ‘Economy in Timișoara: Territorial Distribution of the Economy in the Timișoara Metropolitan Area’ report.

NORBERT PETROVICI

Interdisciplinary Centre for Data Science Faculty of Sociology and Social Work Babeș-Bolyai University

VLAD ALEXE

Interdisciplinary Centre for Data Science Faculty of Sociology and Social Work Babeș-Bolyai University

VLAD BEJINARIU

Interdisciplinary Centre for Data Science Faculty of Sociology and Social Work Babeș-Bolyai University

This research was created within Bright Cityscapes, a programme that is part of the Timișoara—European Capital of Culture 2023 programme, co-funded by: Timișoara City through the Center for Projects, The Romanian Order of Architects and Flex Foundation. With the support of: Azur, Banca Transilvania, Continental, Flex, Hamilton, Honeywell, Nokia

Timișoara’s Thriving Economy in 2022

The ‘Economy in Timișoara: Territorial distribution of the economy in the Timișoara Metropolitan Area’ report was commissioned by Bright Cityscapes to identify the main forces shaping the city’s economy, including worker movements, employment trends, turnover, ownership, and the impact of foreign and local investments. Based on data-driven and anthropological research, the report discusses how Timișoara’s historical spatial design and economic factors produce its ways of working, commuting, and designing. Presented here is an excerpt that focuses specifically on Timișoara’s economic landscape in 2022, offering insights into the city’s economic dynamics, and showcasing its vital role within both the national and regional contexts.

The excerpt reveals how the city has undergone a remarkable transformation, becoming an attractive destination for foreign investment and a thriving hub for employment. At the heart of this economic resurgence lies the service sector, with trade activities making a significant contribution to the city’s overall turnover. Particularly the realms of manufacturing and commercial services, and industries characterised by medium to high technological sophistication, have attracted a lot of foreign investment.

Timișoara’s economic dynamism is further underscored by its status as the second-largest hub for labour resources in the country, following closely behind Bucharest. The city’s labour market reflects a high concentration of employees within both the industrial and service sectors.

However, what truly sets Timișoara apart is its unique economic profile, which deviates significantly from the national economic landscape. This divergence highlights Timișoara’s emergence as a command-and-control centre for the region, boasting a substantial number of management and specialist positions. In essence, the city has become a nucleus of economic activity, playing a pivotal role in shaping not only the local but also the regional economy.

Summary

According to the 2021 Labour Force Survey by the National Institute of Statistics, Timiș County had 261 thousand employees, accounting for 55% of the county's total workforce. The number of employers reached 9.7 thousand, constituting 3% of the total workforce. Additionally, there were 51.2 thousand self-employed workers and unpaid family workers. Timiș County ranked third, following Bucharest and Cluj, in terms of the intensive use of employed persons, accounting for 68% of the county's labour resources, and it held the second-largest labour force volume after Bucharest, with 476 000 people.

The unique economic profile of Timișoara Metropolitan Area is primarily characterised by its combination of economic resources, with a focus on the manufacturing industry and to a lesser extent, commercial services. This sets it apart not only from the national economy but also from other metropolitan areas centred around urban growth poles in Romania.

In the municipality of Timișoara, the highest number of salaried workers is found, largely due to the presence of numerous companies and institutions headquartered there. Most employees in Timișoara are engaged in services and industry, with a significant portion working in the automotive sector.

Other municipalities in Greater Timișoara also contribute to the region's employment. Sânandrei, for example, houses employees primarily in the industrial area, working at Artemis Industrial Park, Ipso Timișoara, B Braun Pharmaceuticals, or Simultan. Giroc is also a significant contributor to employment, with labourers mainly employed at the Incontro Industrial Park in Chișoda. Dumbrăvița plays a crucial role in the employment landscape, housing employers in specialised economic sectors like logistics and transport. Ghiroda, along with the component village of Giarmata, also counts among the municipalities with the highest number of employees in Greater Timișoara. The automotive industry is the primary employer in Ghiroda, represented by companies such as Hella Electronics and Akwel.

Timișoara stands out in terms of the number of managers and specialists it hosts. Despite its size relative to the national population, Timișoara concentrates around 3% of the total number of managers and 4% of specialists in the country.

The industrial sector holds a significant share in Timișoara's economy, contributing 43% of the turnover in 2020 and ranking as the second largest field after services. The manufacturing industry sub-sector plays a dominant role in positioning Timișoara's economic profile, comparable to Iasi, Brasov, Oradea, and Ploiesti. Timișoara and Craiova exhibit lower values for the construction sector, indicating that Greater Timișoara's development primarily centres around metropolitan areas rather than the city itself.

Economic Structure 2022

A Regional Command-and-Control Centre for Manufacturing and Services

The chapter provides an analysis of the economic structure of Timișoara in 2022. It highlights the city's emergence as a destination for foreign capital in the manufacturing and commercial services sectors. Timișoara attracted a substantial portion of foreign direct investment, particularly in the manufacturing industry with a medium to high level of technological sophistication. The service sector dominates, with trade activities contributing significantly to the total turnover. We also examine the employed and salaried population, with Timișoara being the second-largest centre for labour resources after Bucharest. The labour market structure shows a high concentration of employees in the industrial and service sectors. The city exhibits a distinct economic profile compared to other regions, with a low level of similarity to the national economy. Timișoara is identified as a command-and-control centre for the region, with a significant number of management and specialist positions. Overall, the study sheds light on Timisoara's economic dynamics and its role in the national and regional economy.

Socioeconomic background

At a continental level, Central and Eastern Europe have capitalised on the outsourcing of production and business processes of Western European companies, as indicated by Ban (2019). Romania has been one of the beneficiaries of this trend and has emerged as a destination for foreign capital in both the manufacturing and commercial services sectors, particularly after 2011. According to INS Tempo FOM104B, in 2021, 26% of employees in Romania's private sector were employed by companies with full foreign capital. These companies accounted for 52% of the total aggregated turnover and 45% of the total gross value added (Cristescu, 2022: 3). Furthermore, the manufacturing sector employed 45% of its workforce in companies with foreign capital, which generated 68% of the sector's aggregate turnover (Cristescu, 2022: 3).

In 2021, Timiș succeeded in attracting a substantial portion of foreign direct investment, amounting to €4,788 million, which represents 5% of the total balance of such investments in Romania (NBR, 2021). This achievement enabled Timiș to maintain its third-place ranking, a position it has held for over a decade, with only Bucharest and Ilfov attracting a higher cumulative percentage of foreign direct investment (63%). Notably, the manufacturing industry was the primary beneficiary of foreign investment, accounting for 39% of the total balance. Of these investments, 44.3% were allocated to industries with a medium to high level of technological sophistication (NBR, 2021). During the most recent cycle of economic development spanning from 2011 to 2021, greater Timișoara has successfully leveraged foreign direct investment in the industrial sector, with a particular focus on manufacturing industries with a medium to high level of technological sophistication. Notably, the industrial sector has emerged as a critical component of greater Timisoara's economy, accounting for a significant share of its turnover (43% in 2021).

The service sector is characterised by several broad sub-categories of economic activities, including trade, transport and warehousing, business/commercial services, and public/social services. In both Timișoara and Greater Timișoara, the service sector is the dominant sector. Notably, trade activities represent the largest source of turnover in the service sector in both locations, accounting for roughly 43% of the total. However, commercial services contribute only 12% of the total aggregated turnover from services, whereas in other cities such as Bucharest, Iasi, and Cluj-Napoca, these sub-sectors represent important economic sectors, accounting for 20% of the total turnover from services. Despite adopting a similar development strategy for business services, focusing on information technology and communication services, and business support services, Timișoara falls behind other significant urban centres, such as Cluj-Napoca or Bucharest, in terms of the proportion of turnover generated by the IT industry.

Nevertheless, the Timișoara Metropolitan Area boasts a distinctive economic profile, largely due to its combination of economic resources, primarily in the

manufacturing industry and, to a lesser extent, commercial services. This profile sets it apart not only from the national economy (as evidenced by the Hirsch index, which highlights a lack of strong similarity), but also from other metropolitan areas centred around urban growth poles in Romania. As a result, Timiș is the second largest centre in terms of volume of the labour resource, after Bucharest, with 476 thousand people and the second in absolute volume of employees and employed persons. Also, Timiș is the third county (after Bucharest and Cluj) with the highest proportion of employees (55%) and employed people (68%) of the total volume of labour resources.

Employed and salaried population

According to the 2022 Labour Force Survey conducted by the National Institute of Statistics, Timiș County ranks second in Romania in terms of labour resources, trailing only behind Bucharest, with a workforce of 476,000 individuals. The statistical category of 'labour resources' encompasses not only the population of working age who are capable of employment, but also includes individuals both below and above the working age who are actively engaged in work. Of this demographic, 261,000 are salaried employees, constituting 55% of the workforce; 9,700 are employers, making up 2%; and 51,200 are self-employed or unpaid family workers, accounting for 11%. As a result, 68% of the labour resources in Timiș County are actively engaged in work. This places the region third in Romania for labour force utilisation, exceeded only by Bucharest and the Cluj region.

Timiș County is the third county (after Bucharest and Cluj) with the most intensive use of employed persons (with 68%) of the total volume of county labour resources. However, Timiș County has the second largest volume of labour resources, after Bucharest, with 476 thousand people.

Waged work can be calculated based on their domicile or the domicile of the firm in which they are employed. The first source of data is the survey of employees conducted by the National Institute of Statistics, while the second source is the Territorial Labor Inspectorate, which can provide information at the company level. The same information can also be found on the governmental portal data.gov.org, but this data does not include public employers. The differences between the two sources of data are relatively minor. In 2021, the National Institute of Statistics indicated 122 thousand salaried individuals in Timișoara and 170 in the Greater Timișoara Area. In the same year, the Timiș Territorial Labor Inspectorate indicated 130 thousand salaried individuals in Timișoara and 179 thousand salaried individuals in the Greater Timișoara Area.

The municipality of Timișoara has the highest number of salaried workers in the county, due to the large number of companies and institutions headquartered here. When considering the economic sectors in Timișoara, we find that most employees work in services and industry, particularly in the automotive sector (with major employers such as Continental and Hella). It is worth noting that not all employees in these sectors may be salaried workers, as some may be paid hourly or receive commission-based compensation.

The peri-urban municipality of Sânandrei for example, houses a large number of employees in Greater Timișoara, who mainly work in the industrial area at Artemis Industrial Park, Ipso Timișoara, B Braun Pharmaceuticals, or Simultan. Giroc is another municipality with a high number of employees, primarily consisting of labourers from the Incontro Industrial Park situated in Chișoda. Meanwhile, Dumbrăvița presents a considerable cohort of employees at the Greater Timișoara level, with its principal employers functioning within specialised economic sectors, including logistics and transport. Ghiroda, along

with the component village of Giarmata, also counts amont the municipalities with the highest number of employees in Greater Timișoara. The automotive industry is the largest employer in Ghiroda, with companies such as Hella Electronics and Akwel.

The time series data identifies three instances of economic crisis (1997, 2008, 2021) and two phases of economic expansion (2003-2008 and 2011-2020). Intriguingly, during the 2011-2020 growth period, the labour force in Timișoara contracted, witnessing a reduction of 17,000 employees from its peak in 2008 to 2021. Concurrently, the number of employed individuals rose in the metropolitan areas, increasing by 38,000, and in other municipalities within the county, augmenting by 18,000, both over the span from 2008 to 2021.

Fig. 28
Distribution of employees by residence in the Timișoara Metropolitan Area, 2021.

Data source: INS TEMPO FOM104D, 2021.

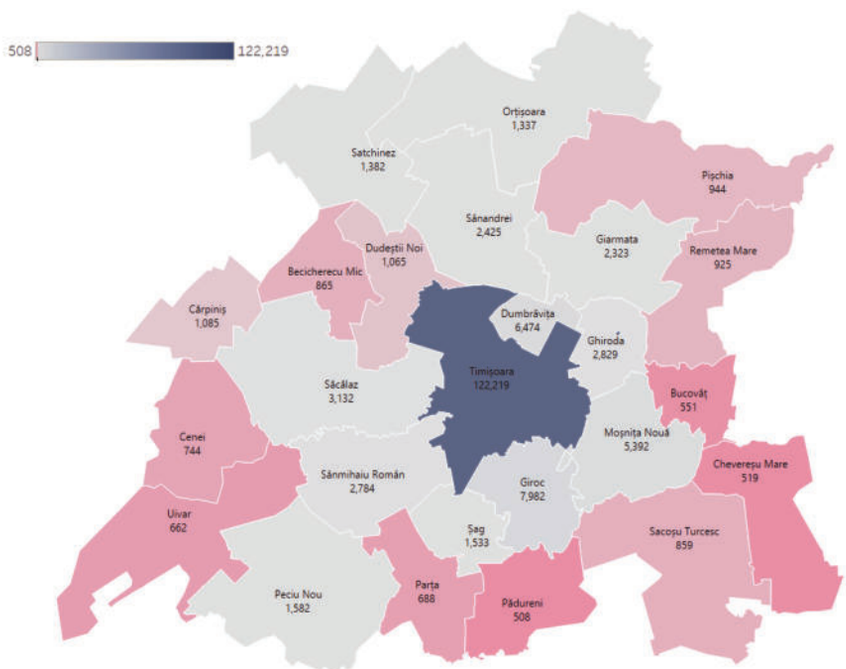


Fig. 29
Distribution of employees by residence in the Timișoara Metropolitan Area, 2021.

Data source: INS TEMPO FOM104D, 2021.

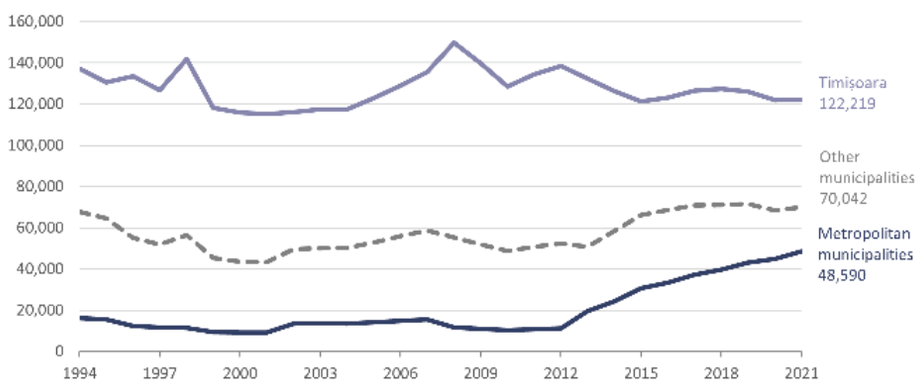
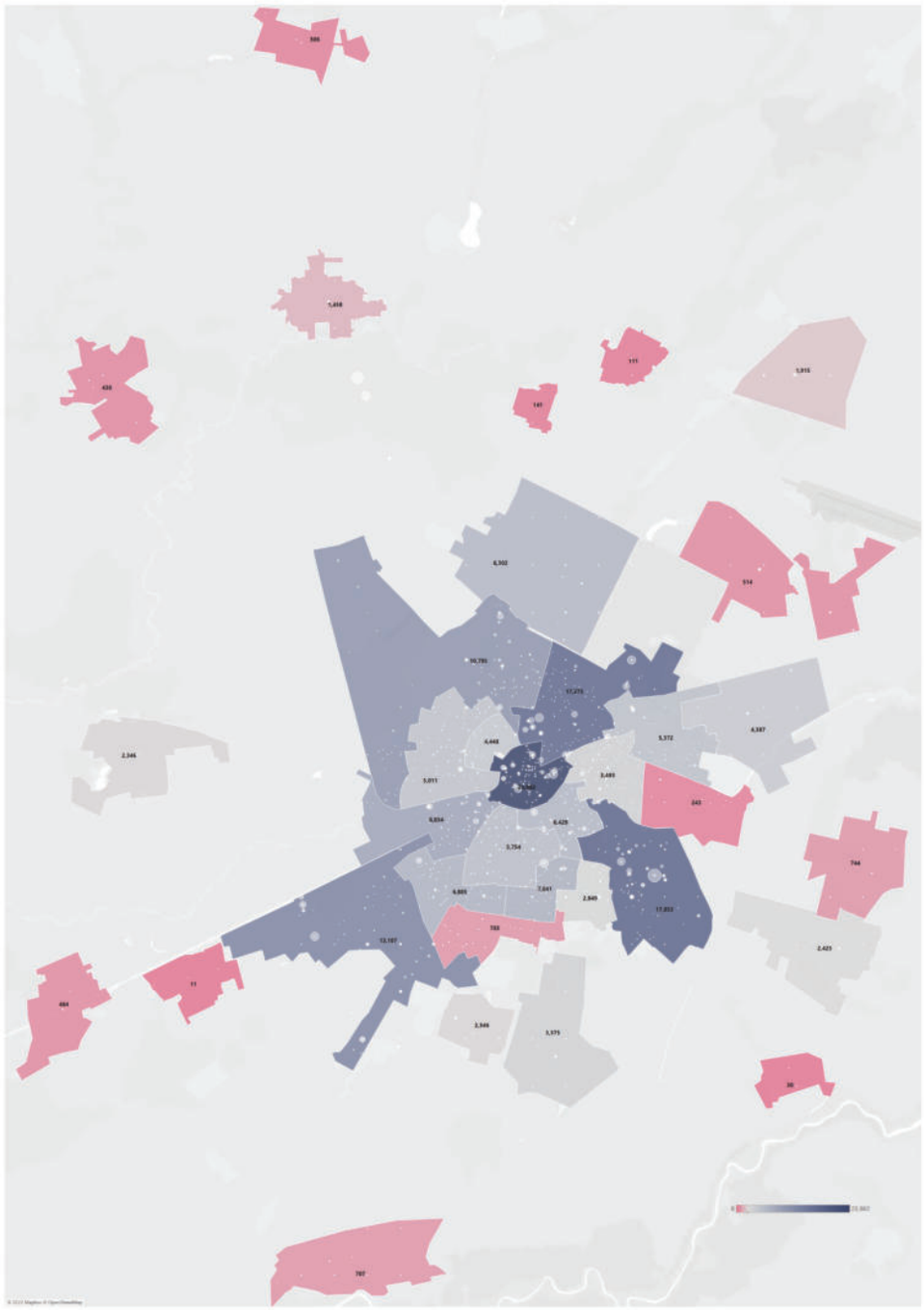


Fig. 30
Distribution of employees by company headquarters in Timișoara and the First Ring, 2021.

Data source: Timiș Territorial Labor Inspectorate, List of active employees by companies, 2022.



Labour market structure

Time series analysis of the enrolled student population and school-age population has indicated correlations with the dynamics of employees in Timișoara and the metropolitan municipalities. Additionally, the analysis of school attractiveness, besides school prestige, has shown that parents' workplaces are essential in understanding families' preferences for certain schools. Moreover, we have observed that school performance is closely linked to residential geography and is also strongly stratified based on parents' education. The dynamics of the school system are influenced by economic factors, especially the labour market, which plays a significant role in shaping it.

Regarding the distribution of employees across sectors, the labour market structure in the Timișoara Metropolitan Area (TMA) exhibits several similarities with other urban centres of similar population size. The services sector (which includes commercial and social services) dominates in TMA, accounting for approximately 43% of total employed individuals. A distinctive feature is the significant share of the industrial sector in the area's economy, which accounts for approximately 31% of total employed individuals in the metropolitan area.

PUBLIC SUPPORT SECTORS

Education and healthcare are structuring sub-sectors for the labour market in the Timișoara Metropolitan Area, representing the largest shares within the services sector (approximately 35% of service employees work in these sub-sectors). Combined, these sectors employ 31.7 thousand individuals across the entire metropolitan area, with approximately 80% concentrated in Timișoara municipality. The significant share of employees in these two sectors is expected, given the role and functions that the urban centre serves both at the county level (as county seat) and at the regional level.

GLOBAL SERVICE URBANISATION

Approximately 28% of total employed individuals in the services sector work in fields connected to global flows of foreign direct investment, which outsource certain business processes (outsourced economy) to other countries besides the country of origin. These fields include Information and Communication Technology (ICT) and Business Process Outsourcing, Shared Service Centers, and Call Centers. These two sub-sectors employ over 25.2 thousand individuals, making them among the largest in the private sector, alongside the automotive industry. The outsourcing of certain commercial services has experienced significant growth in the last decade, primarily in large cities.

INDUSTRIAL PRODUCTION AT THE METROPOLITAN SCALE

Unlike other cities in Transylvania (such as Cluj-Napoca, Oradea, or Sibiu), the industrial sector is concentrated in the municipality of Timișoara, with two-thirds of industrial employees working in the urban centre. The metropolitan municipalities concentrate the remaining one-third of industrial workers in Greater Timișoara. The predominant sub-sectors are represented by the automotive industry and machinery production, which together account for almost 50% of total employed individuals in the manufacturing industry.

DEVELOPMENT OF RELATED SERVICES

The development of outsourcing in commercial and manufacturing services has also led to the development of related sub-sectors for both employees (e.g. cultural or recreational services) and capital (e.g. professional and technical services).

RESIDENTIAL DEVELOPMENT IN THE SUBURBS

As discussed in previous chapters, the population in metropolitan municipalities (especially those in the first ring) is increasing. Along with this shift in population towards municipalities around Timișoara, it is worth noting the significant share that certain sectors, such as real estate services or building construction, have in metropolitan municipalities.

Fig. 31
Labour force structure by categories of local economic activity, 2021.

Data source: Timiș Territorial Labor Inspectorate, 2021

The specifics of the economy

The level of similarity between the local economy and the national economy can be evaluated using the Hachman Index, based on the structure of employees by economic activities. In this case, the index for Timiș County, the Timișoara Metropolitan Area, and Timișoara municipality differs considerably from the national level.

During the period analysed, the Hachman Index shows a downward trend in the degree of similarity of the three territorial economies to the national economy, with a few exceptions per year. The values for Timișoara municipality and Greater Timișoara show significant similarities, with minimal differences between them — in the period 2018-2020, they even coincide. In contrast, Timiș County has an index value of 0.16 for 2020, indicating a small degree of similarity to the national economy but different from Greater Timișoara and Timișoara (both with 0.11).

Therefore, all three spatial units show a low degree of similarity to the national economy for the year 2020. However, the Hachman Index values have increased compared to 2019 when they reached their lowest point during the analysed period (0.13 for Timiș County, 0.09 for Timișoara municipality and Greater Timișoara). We can identify the source of Greater Timișoara's low economic similarity to the rest of the national economy by proportionally decomposing the index. By analysing the sectors that have experienced growth in the local economy over the last decade, we can compare whether they have followed similar or opposite trajectories in the national economy.

Greater Timișoara is distinguished from the national economy by its high share of employees in the industrial sector, which is a characteristic factor at the regional level in Transylvania and Banat. Additionally, specific industrial branches have experienced growth that is not mirrored at the national level. For the period between 2008 and 2020, there has been an expansion in sub-sectors such as the automotive industry, the production of means of production, metal products, and the chemical industry. Although the automotive industry is experiencing growth throughout the country, its pace is more accelerated in Timișoara and its metropolitan areas. On the other hand, there are branches that have experienced contractions both at the national level and in Greater Timișoara, such as the textile industry, which is mainly located in the municipalities surrounding the municipality.

Business support, and information and communications services are specific to the new wave of outsourcing certain processes of global firms. Although experiencing growth in Romania over the last decade, this trend is specific to certain cities that function as regional centres, such as Iași, Timișoara, Cluj-Napoca, and Bucharest. However, growth rates may differ between these cities. Although Greater Timișoara is experiencing an openness to these new sectors, it is worth noting that only business support services have a growth rate higher than the national average, while information and communications

services do not have an increase as pronounced as in Cluj-Napoca, for example. The growth of the business support services sub-sector and, to a certain extent, the professional and technical services sub-sector may be linked to recent industrial development.

The transport sub-sector in Greater Timișoara is experiencing growth, which contrasts with the stagnation observed at the national level. The expansion of ride-sharing, courier, and food delivery platforms may be contributing to this growth. Moreover, the region's geographic location near the western border of the country and its industrial activities have resulted in a high demand for employees in this field.

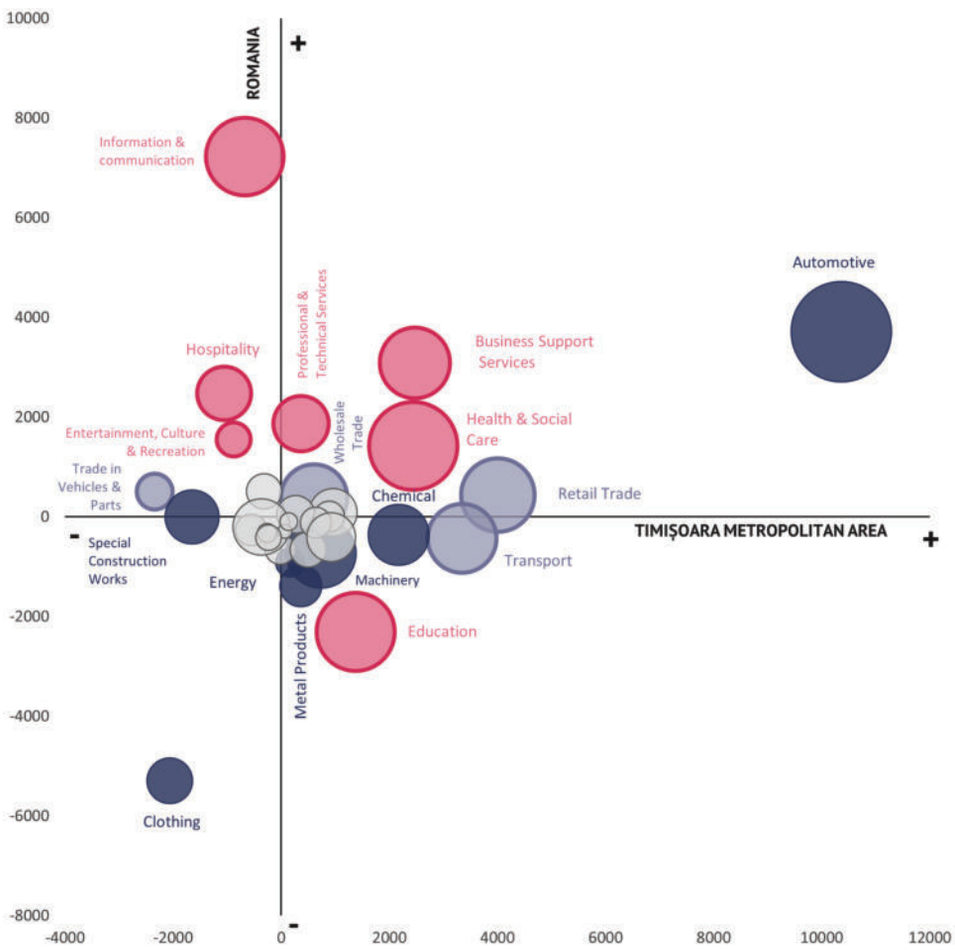


Fig. 32
Economic sectors with the most significant growth in the number of employees in Greater Timișoara, compared to the national level, between 2008 and 2020.

Professional and occupational categories in urban poles

The composition of the workforce is a crucial indicator of a city's level of globalisation. A high concentration of leadership and management positions suggests that the urban centre plays a significant economic and political role in command and control. Global cities tend to have a significant number of such positions, which are responsible for managing transnational capital networks.

A high concentration of specialist positions indicates that the urban centre offers a significant number of service activities to global firms, such as localisation and relocation of movable capital, or outsourcing of business activities. The three most outsourced global activities are information technology and communications, business support services, and engineering, research, and development.

Bucharest is a global city in all contemporary rankings, with a regional influence in Eastern and Central Europe.

More than a quarter of all managers in Romania live in Bucharest, as well as a fifth of all specialists. It is true that Bucharest is the largest city in Romania, concentrating 9.3% of the country's population, that is, around 2 million people (to which is added the population of Ilfov of 400 thousand). However, the proportion of management positions and specialists is very high, three times higher relative to the size of the capital.

Bucharest accounts for most of Romania's aggregated revenues. However, over the past decade, its share has decreased from 65% in 2008 to 44% in 2018, with other cities such as Cluj-Napoca, Iasi, and Timișoara experiencing a growth in their share of aggregated revenues.

Timișoara, Cluj-Napoca, and Iasi play a significant role in regional polarisation and serve as command-and-control centres for various regional urban areas. These cities have a high percentage of their population employed in the service sector, with over 50% of the total workforce. Other cities, such as Constanta, Brasov, Craiova, Oradea, and Ploiesti, also have regional significance, even if they do not serve as command-and-control centres. These cities have a workforce employed in the service sector ranging from 40% to 50% of the total employees in the locality.

Cities such as Timișoara, Cluj-Napoca, and Iasi have a smaller population, with around 340 thousand inhabitants, which is around 1.5–1.6% of the Romanian population. Despite their smaller size, these cities participate in global capital flows, which affects their social composition. In all three cities, at least one in three employees holds a specialist position. In contrast, in other growth pole cities such as Constanta, Craiova, Brasov, Oradea, and Ploiesti, only one in five employees hold specialist positions.

However, a noticeable relative disproportion of managers and specialists in relation to the population is apparent. In this case, Timișoara concentrates approximately 3% of the total number of managers and approximately 4% of the total number of specialists in the country, which represents at least double the proportion expected based on the city's size relative to the national population.

In addition to these demographic groups, there exists a layer of pupils, a valuable resource for recruitment pools for specialist and managerial positions. In Timișoara, there are approximately 43.4 thousand pupils, constituting roughly 14% of the urban population. In contrast, Cluj-Napoca boasts around 71.7 thousand pupils in the 2020–2021 academic year. In Bucharest, the proportion of pupils is not as significant, accounting for 5% of the population, owing to the sheer size of the capital's population.

Fig. 33
Occupational categories in relation to the total number of employees in each growth pole, 2020

Technical data: Starting from the distribution of employees in 2020 by the activities of the national economy in the balance sheets of companies and using the distribution of occupations by activity in each growth pole at the 2011 census, we calculated the distribution by occupational categories.

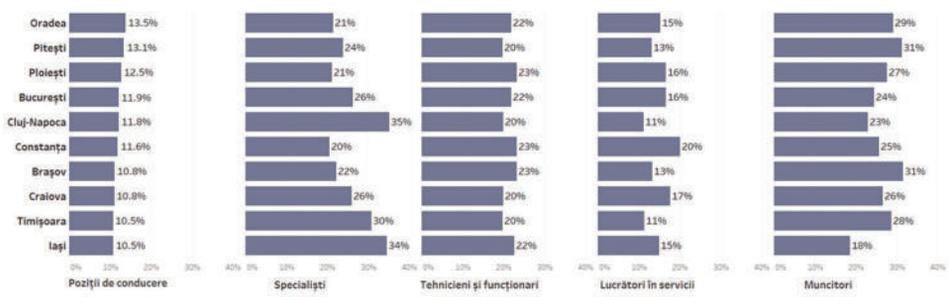
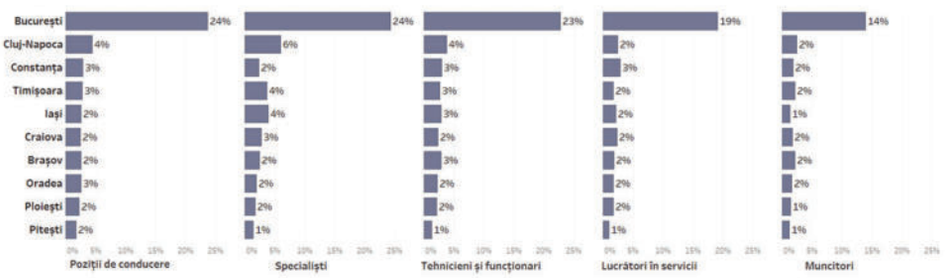


Fig. 34
Occupational categories in relation to the total number of employees in the same category in Romania, in each growth pole, 2020



Aggregated turnover by economic activity

AGRICULTURE

Timiș County has a high potential for agriculture. However, the turnover obtained by companies in Timișoara from agriculture is extremely low, representing only 1.6% of the total turnover recorded in the city in 2020. This is not surprising, as lands on the outskirts of large cities are primarily intended for other types of activities.

INDUSTRY

The industrial sector holds a significant share of Timișoara's economy, representing 43% of the turnover in 2020 and ranking as the second largest field after services. The manufacturing industry sub-sector dominates, positioning Timișoara as an economic profile comparable to Iasi, Brasov, Oradea, and Ploiesti. Timișoara, along with Craiova, exhibits the lowest values for the construction sector. This finding, in conjunction with previous analyses, supports the hypothesis that Greater Timișoara is primarily developing in metropolitan areas, to the detriment of the city itself.

SERVICES

The service sector can be divided into several sub-categories based on INS categories, including trade, transport and storage, commercial services (hotels and restaurants, information and communications, financial intermediation and insurance, real estate transactions, professional activities, administrative services), and social services (public administration and defence, education, health and social assistance, entertainment, recreational and cultural activities).

In Timișoara, the majority of turnover from services comes from trade activities (about 43%). Despite being a city dominated by the manufacturing industry, Timișoara has a large percentage of its service sector coming from trade.

In Timișoara, the majority of turnover from services comes from trade activities (about 43%). Despite being a city dominated by the manufacturing industry, Timișoara has a large percentage of its service sector coming from trade. Key sectors of commercial services (12%) are relatively small compared to cities where these sectors are economic engines (20% in Bucharest, Iasi, and Cluj-Napoca). However, Timișoara has developed its commercial services anchored in information and communication services (approximately 38% in 2020 from commercial services). The proportion of these sectors is lower than in Cluj-Napoca, where two-thirds of the turnover in commercial services is made in ICT, but similar to that of Bucharest and Iasi. Except for Craiova, which is intensive in medium high-tech activities, all other growth poles, including Timișoara, fall under the less knowledge-intensive services group.

Fig. 35
Turnover on large economic sectors in the growth poles, 2020

Data source: Economic Operators' balance sheets, 2008–2020, Ministry of Public Finance, data.gov.ro.

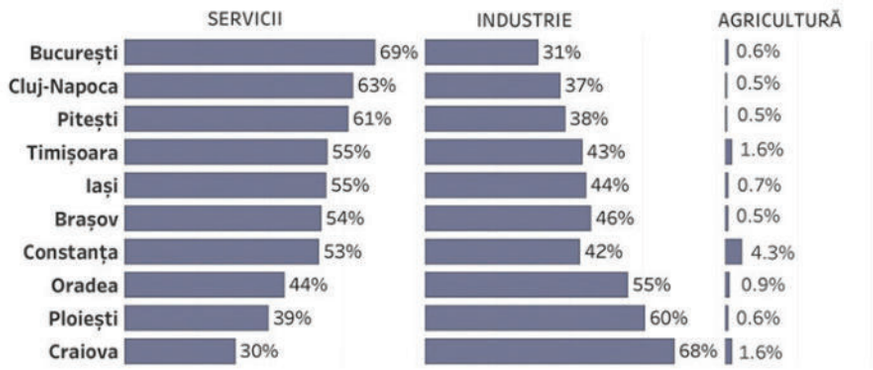


Fig. 36
Turnover by economic sub-sectors in growth poles, 2020

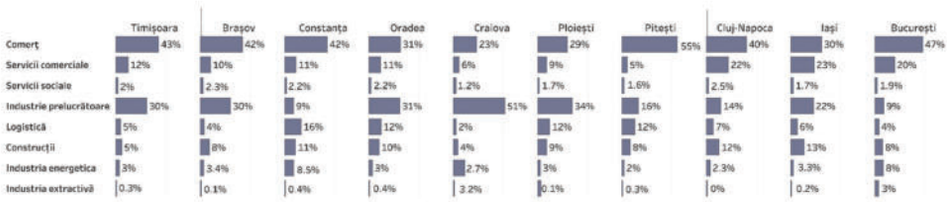


Fig. 37
Turnover in key sub-sectors of services in the total sector growth pole services sector, 2020

Technical data: (a) sub-sectors strongly connected to global outsourcing flows and (b) sub-sectors providing services to capital or employees in these sectors have been selected.

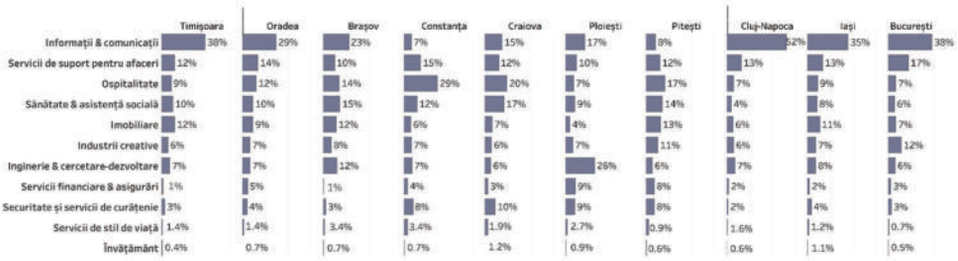


Fig. 38
Turnover by sector, 2008–2021, mil. Ron, Timiș

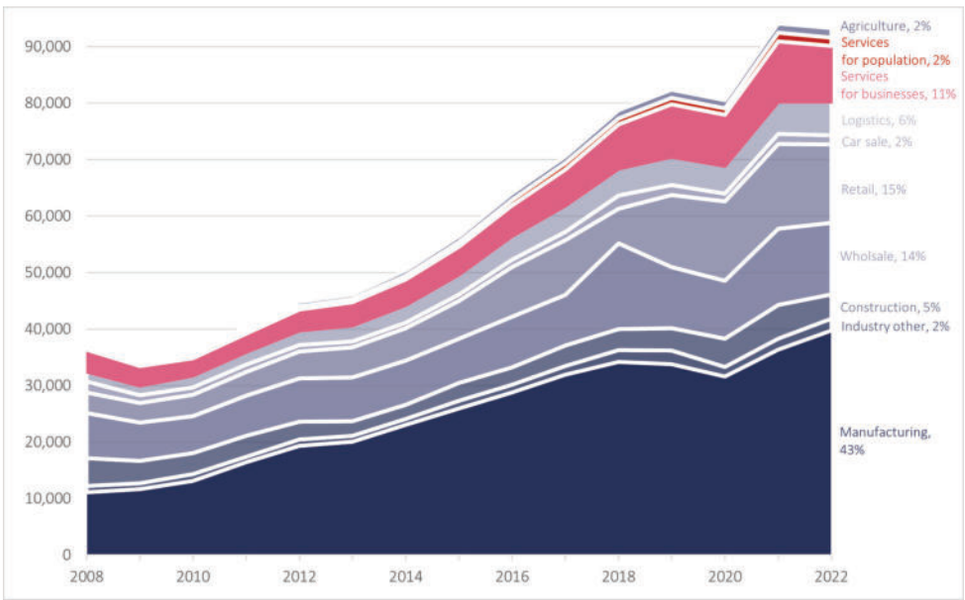
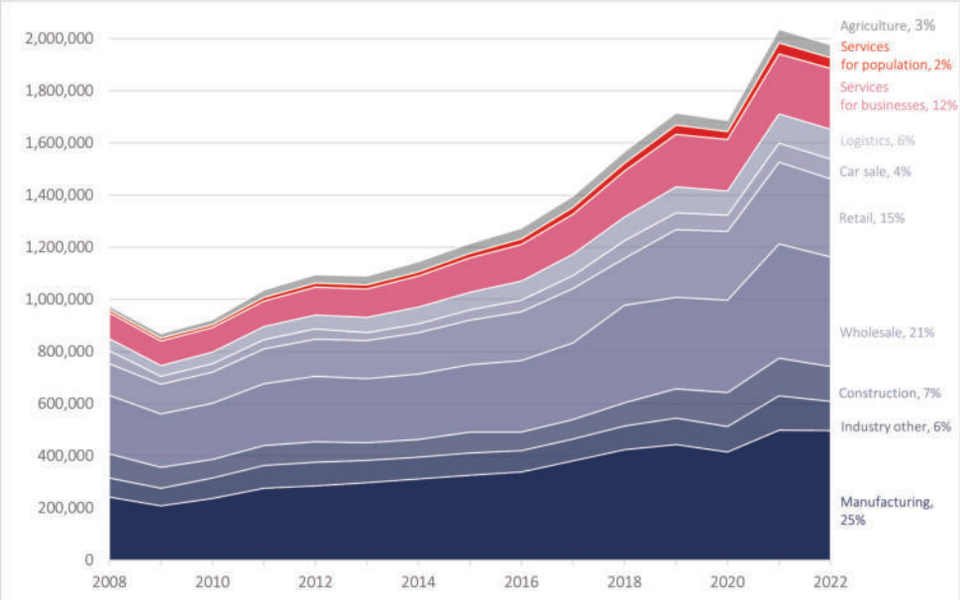


Fig. 39
Turnover by sector, 2008–2021, mil. Ron, Romania



Tab. 12
Turnover by sector, 2008–2021, mil. Ron, Romania

Above-Average Differences:
- p < 0.001
- p < 0.050

Below-Average Differences:
- p < 0.001
- p < 0.050

	2008	2012	2019	2020	2022
Manufacturing	30%	43%	41%	39%	43%
Industry other	3%	3%	3%	2%	2%
Construction	13%	7%	5%	6%	5%
Wholesale	21%	17%	13%	13%	14%
Retail	10%	11%	15%	17%	15%
Car sales	5%	2%	2%	2%	2%
Logistics	5%	6%	6%	6%	6%
Services for population	1%	1%	1%	1%	2%
Services for businesses	10%	8%	11%	11%	11%
Agricultura	1%	2%	2%	2%	2%
Total	100%	100%	100%	100%	100%