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MANAGEMENT *ANTE* MANAGEMENT: EARLY WORSHIP SETTLEMENTS AND URBAN PLANNING

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Abstract: *This paper aims at proposing a topic less discussed: early human worship settlements and ancient urban agglomerations as the roots of strategic management thinking in urban planning and strategic development. The purpose is to explore as back as human ancient times to identify early means for time reckoning (i.e. solar calendars) that made possible strategic thinking and multi-year planning. The solar calendar as time-reckoning system was an essential element for strategic, multi-year planning – corresponding to the basic management function: planning (including reliable forecasting) – vital for designing the urban settlements, while considering the communities' needs for a livable environment, resources and security, in their dynamic (population growth).*
The two focal points of investigation (early human worship settlements and ancient urban agglomerations) are coherently linked by highlighting the essential dimension needed for planning: the time dimension. They are also linked by an arch in time that supports the results reported by archaeologists using top technologies: genetics and radio-carbon chronology.
Essentially qualitative, the study is completed with quantitative elements, when possible. Mainly secondary research (literature survey) is used, supported by primary research (as observation) illustrated by examples – from both Romanian and international environment.
The findings are critically important for understanding the evolution of urban agglomerations and urban strategic planning from multiple modern perspectives: function/s of the scientific management; current trends of strategic thinking; current issues of urban development (i.e. sustainability, smart city). Their implications are also useful for both scholars and practitioners, while designing, updating and implementing urban plans.

Keywords: *Worship settlement, Urban agglomeration, Urban planning, Planning function, Management functions*

INTRODUCTION

The *scientific management* has celebrated a century since its birth, which – for an area of knowledge – looks promising young. However, the *scientific management* (as a new discipline, area of study and research) should not be confused with the older word *management* (*to manage*) as a word used in English for long time before (probably taken in the 15th century from French) – initially in that sense of *handling*. Even deeper back in time, the word manage has its roots in antique Latin language. And the reason is as logical as simple. The people (not only English or French or Europeans only), *all people* have been taking care (*i.e. managed and administered*) their households and farms, arts and trades since they started to cultivate the land for farming and took care of their cattle [1] (p. 16) – in their own words and languages. This makes us think about the life of earlier humans, how they did succeed *to manage* their daily life's activities as well as *cyclical* land-related works. All these *millennia before* the founding fathers of the scientific management – Frederick Winslow Taylor (1856–1915), Jules Henry Fayol (1841–1925), and Henry Laurence Gantt (1861–1919) – were producing their seminal books. To limit the list to their names is neither rigorous nor totally fair; but it is fully documented by their seminal works and activity, both in theory and practice. However, a few legitimate questions stand still: Did the *scientific management* spring from scratch? Wasn't anything before it? Even so, why did it appear? Why exactly in that period? And, on top of these – considering their engineering background: Why just engineers?
A previous study [2] provided some answers to these questions. There are a couple of observations to make related to the dawn of scientific management and its founders – whose contribution was crucial and undeniable: (i) before their seminal works, they delivered lectures and conferences, authored papers and books connected to their engineering jobs and also sections, chapters and/or earlier versions; (ii) still observing the research code of ethics, it was quite normal – considering the circumstances of that period (language/translation barriers, international conflicts, reduced number of events and publications) – that their and others' earlier works encompassing the area of scientific management and administration to remain unknown because of relatively reduced mobility of the scientific works.

Scarlat [2] (p. 12) has shown that the 'burst' of the scientific management during early 1900s was "a remarkable progressive leap in the knowledge history of the modern society; [... it] *was the result of an organic evolutionary process of the human society entirely, answering to its own needs and reflecting its own aspirations."*
Then: *Why there* [in the Western world]? The answer is complex and requires a more documented analysis, considering a multitude of factors; this endeavour is beyond of the purpose of this essay. However, the commonsensical explanation is that the Western world (from Western European France to the North-American United States) was more industrialized, economically advanced, and better prepared for answering to the pressure of accelerated development of steel and metal processing industry – as Towne [3] has shown in 1886 – that had required newer, more adequate methods – in order to manage the more dynamic business organizations.

Additionally: *Why engineers*? The opinions might be shared; nevertheless, the engineers were exactly in the middle of the above mentioned industrial processes (*e.g.* mining and oil industries, automotive industry were among the most dynamic industrial sectors by that time), and ready to provide immediate, suitable answers to the questions they were already aware. And, it should not forget that 'engineers' were exactly: engine designers, makers and operators!

Fact is that multi-century and even millennia old roots can be found in the oldest wisdom writings and in the philosophers' works from antiquity [2] (pp. 7–11): the religions and their institutions have developed in their particular ways and were associated with religious *leaders* and *hierarchies* that observed the development of different religions and religious orders; the military *organization and strategy* have developed associated with the development of the state *administration*, while *bureaucracy* [4] was the result of post-Renaissance booming development of crafts, trades and commerce.

This essay is a new attempt to complete the picture of the roots of the scientific management from another standpoint: the urban planning from its dawn in antiquity and the city development in the Middle Ages were a result of longer-term strategic thinking. Planning – as a primary function of management [5–7] – cannot be correctly completed without reliable predictions, and, implicitly, it is impossible to perform without *reasonably time-related framework as well as calendar system*. Hence the purpose of this paper and its corresponding structure: methodology, early calendars and urban planning, discussion and conclusions, limitations and further research.

METHOD

The purpose of this paper is to explore as back as human ancient times in order to identify early means for time measuring as solar calendars – with the *objective to uncover the seeds of one of the scientific management functions (planning)*. The solar calendars and time measurement made possible longer-term thinking and multi-year planning; in concrete terms they made possible the design and development of urban settlements in such a manner that would consider the community's current and future needs (i.e. to create a liveable environment as well as defence and security for the inhabitants, in the foreseeable future).

Essentially qualitative, the study is completed with quantitative elements, when possible. Mainly secondary research (literature survey) is used, supported by primary research (as observation) illustrated by examples – from both Romanian and international environment.

There are two parts (early worship settlements and ancient urban agglomerations) yet intimately and historically linked. The early gatherings locations served as solar calendars and were used for worship, burial and periodic ceremonials; they also prefigured the future community settlements and future urban agglomerations.

EARLY SETTLEMENTS FOR GATHERING, WORSHIP, CEREMONIALS, AND TIME KEEPING

Strategic urban planning has been a key aspect of city-building since ancient times. The general model for city development and urban planning – if such concept did exist at all – was based on community needs (liveable environment, available resources, defence and security) rather than principles of urban design. Therefore, most of the old cities and urban agglomerations have developed following natural conditions (sources of drinking water), food resources or trading routes. Since antiquity, there were bright minds that have had the genius and vision of urban planning. However, urban agglomerations were anticipated by earlier settlements for gathering, worship, various ceremonials (season and harvest-linked, burials, etc.), and time keeping systems – as solar calendars.

Earliest worship settings: circularly sanctuaries

Stonehenge. The Stonehenge monument is situated on Salisbury Plain in South of England: "It is the most architecturally sophisticated prehistoric stone circle in the world. Together with inter-related monuments and their associated landscapes, they help us to understand Neolithic and Bronze Age ceremonial and mortuary practices.

They demonstrate around 2000 years of continuous use and monument building between c. 3700 and 1600 BC." [8] (p. 21). Nowadays ruinous, the stone-built complex is aligned towards the sunrise in the summer solstice – which demonstrates its early functions: astronomical observations [9], and gathering place for religious ceremonials.
Burial site for a long period – as archaeological works demonstrate [10] – Stonehenge (Figure 1) was not inhabited *per se*. However, it is placed in the middle of the densest complex of Neolithic and Bronze Age monuments in England. Recent research [11] has shown that at least some of the population at Stonehenge originated and lived in Western Wales and then migrated. Hence the idea of a center of increasing importance that anticipates future urban agglomerations (as population is growing) around an attractive central worship location.

Figure 1: Stonehenge monument (source: cover cut from Young, Chadburn and Bedu [8])

Darvill's theory is that circular stones setting served as a solar calendar based on a tropical solar year of 365.25 days, arguing that "It is entirely possible that communities living in north-western Europe during the late fourth and third millennia BC developed a solar calendar of the type suggested here on their own initiative. Evidence for the alignment of several passage graves […] on celestial events during the winter solstice may support the idea." [9] (p. 329). However, Darvill does not reject external influences from Eastern Mediteranean, 3500 km away (*Ibidem*, p. 330): "Here, during the fourth millennium BC, a variety of lunar-stellar calendars used observational astronomy to reconcile the movements of the moon and stars with the daily and seasonal cycles of the sun. […] Back calculations using the pre-existing lunar-stellar calendar suggest that the Civil Calendar started in 2773 BC [… and] was widely used during the Third Dynasty at the start of the Old Kingdom, c. 2658 BC." Notably, the Egyptians were not the first to use such calendar – as similar time measuring systems were being used in Mesopotamia by the late fourth millennium BC [9,12].

Sarmizegetusa. Sarmizegetusa Regia was the capital of the Kingdom of Dacia (c. 80 BC–106 AD), destroyed after the Roman conquest (106 AD). Kingdom of Dacia – approximately on the territory of modern Romania - "had been an intermittent thorn in Rome's side for almost two centuries. The ambitions of Burebista [c.80 BC–44 BC] and the actions of his various successors continued to threaten Roman hegemony along the lower Danube, culminating in the rise of the powerful kingdom of Decebalus." [13]. Sarmizegetusa Regia – which was one of the six Dacian fortresses that formed the capital's defensive system (today UNESCO World Heritage sites) – "contained a citadel and residential areas with dwellings and workshops as well as a sacred zone" [14].

Figure 2 depicts the ruins of the Dacian temples and worship place. Among ruins, in the background, it is of interest to observe the sacred area: the great circular sanctuary – *which is very similar – as shape – to the Stonehenge monument*. It is likely that circular sanctuary served as solar calendar (the origin and influence is beyond the scope of this essay – it is up to expert archaeologists to decide). However, it is noteworthy to mention that Dacian complex, besides being relatively more recent than Stonehenge monument, illustrates how an early urban community (the capital of the Kingdom of Dacia) coagulated around a worship site, which, nevertheless, included a calendar system *– essential for (strategic) planning*.

It is important to note that this paper is *focused on the planning function of the scientific management only*, while the discussions on the other principles of the scientific management (organizing, leading, controlling, and coordination eventually) are beyond its scope of work. Nevertheless, such an ambitious endeavor may not limit to the ancient urban planning – as it also should be complemented by keen and accurate study of wisdom writings and in the philosophers' works from antiquity; religions institutions, leaders and hierarchies; military organization and strategy

[2]; state administration and bureaucracy [2,4] – associated with permanent development of crafts, trades and commerce associated with the people's daily activities reflected in proverbs [1].

Figure 2: The ruins of the Dacian temples (source: adapted after [2])

EARLY *PLANNED* URBAN AGGLOMERATIONS

Grid cities

The organized street grids are known from antiquity. According to *The Economist* [15] (p. 21), the first grid-planned city known to archaeologists is Mohenjo-Daro (2600 BC) in Pakistan (Figure 3). Analyzing the constructive details of the town Mohenjo-Daro, Pant and Funo [16] (p. 51) demonstrate "a relationship in their town plan, the division of quarter blocks and the plot divisions as shown by the built clusters and street boundaries" – which is "the first direct evidence to link the urban civilization of Indus with the living settlements that continue to exist up to modern times."

Figure 3: The grid-planned city of Mohenjo-Daro in Pakistan
(source: adapted after [16])

Hippodamus of Miletus (5th century BC) is the earliest known urban planner: his plan provided even square blocks forming a *rectangular grid of streets* around a fortified center that could defend against outside threats. Similarly, ancient Greek and Roman cities were also built with a focus on urban planning. For instance, the ancient city of

Athens was designed with a grid-like street system and several public spaces, including the agora, which served as a hub for social and commercial activity. Meanwhile, Roman cities were known for their aqueducts, sewage systems, and public baths, which were all crucial components of their urban planning.

Mommsen [17] (p. 38) explains the strange case of the first urban settlements in Italic Peninsula: citadels and cities (different by the number of gates: only one, minimum three, respectively). They were surrounded by solid walls but usually empty as they served as refuges for the farming population in the neighborhoods. Mommsen also describes Rome by 500 BC: a squared city (*Roma quadrata*) of maximum 5.5sqmiles populated by around 10,000 inhabitants, able to raise a civic guard of 3,300 members (p. 44). Another documented source about ancient cities of Athens and Rome is De Coulange [18] (pp. 154–298): *Book Third: The City*.

Many other ancient civilizations also placed a significant emphasis on strategic urban planning. From the Mayans of Central America to the ancient Egyptians and Mesopotamians, careful consideration was given to the layout and design of their cities, demonstrating the importance of thoughtful and intentional design in creating functional and sustainable urban environments.

Middle ages: From circular sanctuaries to radial cities

During middle ages, the European urban planners have designed easy-to-defend radial cities, with roads that spread out from a central plaza, surrounded by rock-solid walls and towers. The Florentine architect and urban planner Antonio di Pietro Averlino *aka* Filarete (15th century) is best known for designing an ideal fortress-city – star-shaped – with roads converging to a central square dominated by a church, and defended by walls [19]. Nowadays, the Romanian active port of Braila on the Danube river [20] (p. 4] display such radial, respectively semi-radial urban plans.

Are the grids coming back?

However, the urban grid design was coming back, mainly for economic reasons [15] (p. 21). In 1681 the *Law of the Indies* (Leyes de las Indias) [21] decreed that in the Spanish colonies from South America and Asia new cities should be planned on grids as in Europe, with large squares at the centre for churches. In the North, new American cities were developed observing Thomas Jefferson's land ordinance (1785) according to which the yet-unconquered land to the west was divided in perfect grids to make it easier to sell plots to farmers, and fund the young government. In new towns, the grid pattern made it easier for trams to transport people between the new developments and the city: in an urban grid of streets a network of trams could provide rapid transport by taking two trams only – one travelling north and south and another heading east or west [15] (pp. 21–22].

According to Aurbach [22], the grid design allows *functional traffic separation*: (i) pedestrians from vehicles; (ii) fast vehicles from slow ones; and (iii) through traffic from local traffic. Grids can have networks of wide main roads and narrow streets, with crossings for pedestrians and faster traffic – constrained to wider through streets – leaving narrower streets quieter and less polluted.

Balancing between radial and grid-cities … towards our days

Yet the radial cities had their arguments and champions in the 19th century. Inspired by Ebenezer Howard [23] who argued that everyone should live in radial 'garden cities' of no more than 32,000 residents, governments started to encourage more human-friendly urban design: curved streets, and separation between industrial and residential areas.

New cities (as Chandigarh, India, in the 1950s) were designed by famous architects as Le Corbusier [24] according to these principles. In the new settlements across the world many streets end in cul-de-sacs. As urban planner Jeff Speck explains, cul-de-sacs are cheap: a larger number of detached houses can be placed around a small piece of tarmac [25,26].

During the last decades, cars and mass driving have brought new challenges: more cars on the streets meant more traffic congestions, intersection bottlenecks, and more opportunities for crashes. The cul-de-sacs keep out unwanted traffic; nonetheless, this advantage for the residents comes at the expense of non-residents [25,26]. Ultimately this debate uncovers a larger issue the urban planners are facing: comfort *versus* cost or quality of life *versus* economy – which is a false dilemma actually because always the quality of life comes at a price. Besides traffic, the urban agglomerations experience significant increase as number of inhabitants – not only in the more urbanized developed countries but also in the countries less so, as African countries [27]. Jane Jacobs, an influential critic of the car-centric cities, argued [28] that what matters most is the outdated city infrastructure (street grid included): the blocks are short, and the roads not too wide.

Building a new city from scratch is not out-of-options, even a new capital city: Brasilia, the new capital of Brazil inaugurated in 1960, is such a case. Designed by the famous architect Oscar Niemeyer, it is neither grid nor radial

city; or it is both and more. It seems that not only the cul-de-sacs are a dead end for city planning but the urban planning itself should look for different strategic approach while thinking and designing the future cities.

DISCUSSION: NEW THEORIES & STRATEGIC LINES OF THINKING ON URBAN SUSTAINABILITY

One line of thinking is following the human nature and tradition, nature principles and laws, yet continuously exploring new frontiers [29] – as Bejan's constructal theory [30–33]: *the Constructal Law is the physics principle that unites the phenomena of design and evolution in nature, in both animate and inanimate systems.* In urban planning terms, just let the cities (i.e. city streets) develop naturally – as rivers flow and trees are growing.

Another significant line of thinking is promoted by Geoff Boeing and collaborators [34–37] who proposed the *city entropy* as a measure of the city orderliness of different street systems. The city entropy has values between 0 (a city with absolutely no consistent street direction) and 1 – which means a perfect grid (the city streets run with no interruptions, direction changes or curvatures). On this scale, Chicago (USA) tops the ranking with 0.89.

Lowe and collaborators [38] have assessed *health and sustainability indicators* for 25 cities in 19 countries, providing evidences that cities need to transform urban governance to enable *integrated planning* for health and sustainability and commit to policy implementation. They also provided tools to replicate the proposed indicators for launching the *1000 Cities Challenge* via the *Global Observatory of Healthy and Sustainable Cities* - in which policy makers and researchers are invited "to participate in gathering policy and spatial data for their city and calculating indicators of healthy and sustainable urban policy, design, and planning" [38] (p. 119].

Arup Group Limited is a British multinational professional services firm founded (1946) to be 'both human and excellent, dedicated to sustainable development'. It supported the C40 network of city mayors that promised to 'build back better' by creating '15-minute cities' where residents could access their daily living needs by active modes of transport [39] (p. 35). The *15-minute cities* are expected to improve health, equity, and sustainability, and contribute to climate change mitigation, through compact design that enables active transportation and reduces motor vehicle dependency – by prioritizing walking, cycling, and public transport [40]. These *15-minute cities* are suppose to use eleven *integrated* urban and transport planning and design interventions – the 11Ds [41,42]. The 11Ds refer to four regional planning interventions and seven local urban design interventions [38] (p. 112).

Overall, these new theories and strategic lines of thinking demonstrate the growing recognition of the importance of urban sustainability in shaping the future of our cities. By promoting more sustainable development patterns and enhancing the resilience of urban communities, we can create cities that are more liveable, equitable, and environmentally sustainable for future generations.
Regardless the theoretical approach and line of thinking, it is vital to consider the current and future challenges the humankind has ahead. It seems that strategic goals of urban planning and development are merging – as *city smartness and sustainability do not contradict each other* [43].

THE 3RD DIMENSION OF THE URBAN PLANNING: LIMITATIONS. WHAT ABOUT THE FUTURE?

As a qualitative essay looking with strategic management lens back to the humans' millennia long history – where radio-carbon technology and archaeology meets genetics to give birth to archaeo-genetics [44,45] – is not only risky but certainly a far to be completed endeavor.

In addition, besides the multitude of issues related to modern cities that urban strategists have to address – traffic safety, seismic resilience, energy efficient building, energy smart grids (grids again!), smart and sustainable infrastructure, green environment and fighting pollution, carbon print reduction – there is a phenomenon that should be highlighted: the *third dimension of urban planning* and development. The 3rd dimension does not mean only building higher and higher *towers* – either for residential or office buildings, either for private or public interest (consider defense and observation towers, fire and water towers, television and 4G & 5G towers) – but also a revolutionary change from 2D to 3D while thinking and designing urban settlements assisted by geo-spatial technologies as GIS-Geographic Information System [46,47]. It is not uncommon that there are cities (as Philadelphia, PA, USA) that have limited the height of their buildings.

On top of all these, the third dimension of the city is going to be shared by newer types of aircrafts like drones, heli-taxis and flying cars, each type having reserved its own flying altitude [48]. Therefore, the geospatial technologies will play an increasing role while designing the smart cities of the future – besides BIM technologies (building information modeling) and 3D city design.

The way to the outer space is open. Unfortunately, the outer space looks already crowded.
Yet: *Do the outer space and phenomena produced in the outer space have any influence on the city-life*? If 'yes', then 'how'? Future papers have large areas of investigation in terms of urban planning and development strategies.

CONCLUSION

There are two revealing, key concluding remarks: (i) interdisciplinary investigations demonstrate that early urban agglomerations from antiquity were coagulated around worship sites that included solar calendar systems (as Stonehenge or Sarmizegetusa Regia) – which were *essential for the time measurement* and made possible *forecasting and longer-term planning function of management*; (ii) along history, from antiquity through the middle ages, *urban planning* has followed obvious, carefully designed patterns (either radial or rectangular grids), which considered the future population growth and urban development, up to the modern concept of sustainable development.

All these have happened before the dawn of the modern scientific management, anticipating the formulation *of the scientific management principles (among them planning) and current management practice (strategic planning).*

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