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The emergency of resource flow management in Palermo, Italian Capital of Culture for 2018. A proposal for a circular management integrated in its old town center.

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Abstract

The present study aims at examining the gap between both the exponential openness of Palermo to the international scene, causing a wide acknowledgement of its cultural attractiveness, and its unflappable management of city services that will face after the consequent increase of tourist and urban flows to the historical and cultural areas of the city. Our interest is especially focused on waste to be intended as resource flows in a circular management system. Compared with the other urban areas, the management of city services in the old town center is characterized by some operative issues to be faced: its specified morphological urban texture and its immaterial, psychological, and symbolical values acquired over the centuries.

The overall situation of the old town center of Palermo is featured by a delayed reply to the current emergency that, of course, cannot be considered as a sustainable reaction to the difficulties met.

The circular re-organization of a service - such as the management of material flows - is the ideal opportunity for a landscape regeneration: in this case, landscape is not just a mere protected site but it is involved in circularity becoming a resource, an attractor, and an active component playing an important role for the local economic development. In other words, it is a resource to be enhanced through a long-term planning and led by a systemic vision where both tangible components (technologies and infrastructures) and intangible ones (socio-cultural identity and relational factors) are boosted and complementary.

Keywords: Palermo, Capital of culture, resources flow, circularity, waste

1. Palermo, the Capital of Culture between planning and emergency¹

In spite of all its contradictions and delays, Palermo is the cultural capital par excellence. It is a city with a wide heritage made up of knowledge, beliefs, traditions, customs, architectures, monuments, and art owning also natural and landscape relevancies that, regardless of decay and oblivion, are still recognizable and usable. Thanks to this new central role, today Palermo is trying to start its regeneration and re-foundation from this cultural background characterized by a syncretic and multicultural past. Looking ahead, the city aims at an ambitious plan: its culture, newly proposed and reaffirmed with tenacity, will become the cornerstone of a new urban planning and vision. This attempt has been already bearing fruit with important, unique, and recent awards showing the first fundamental results. UNESCO inscribed Arab-Norman monuments in Palermo on the World Heritage List. On 3rd July 2015, during the 39th session of the World Heritage Committee held in Bonn, the 'Arab-Norman Palermo and the cathedral churches of Cefalù and Monreale' site was inscribed on the

¹ This paper is the result of a wider research coordinated by Antonella Mami and destined to the participation in PRIN 2010-11 (projects of national interest by the Italian Ministry of Education) with seven research units. The historical urban area and the case study of the old town center of Palermo were the subject of Elvira Nicolini's PhD thesis. So, it arises from a common and shared project. In this contribution, however, the author of paragraph no.1 is Antonella Mami while paragraph no. 2 and no.3 has been written by Elvira Nicolini.

World Heritage List (WHL). This site is composed of nine monuments: seven architectures are in Palermo while five of them are located in its old town center.

This award responded to the criteria established by UNESCO that are: "To exhibit an important interchange of human values, over a span of time or within a cultural area of the world, on developments in architecture or technology, monumental arts, town-planning or landscape design" and "To be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history".

In this way, UNESCO recognizes that "the whole 'Arab-Norman Palermo and the Cathedral churches of Cefalù and Monreale' site bears witness to a particular political and cultural condition characterized by the fruitful coexistence of people of different origins (Muslim, Byzantine, Latin, Jewish, Lombard and French). This phenomenon encouraged the interchange of human values and the formation of a lively cultural syncretism; as for the monuments, it generated a conscious and unique combination of elements derived from the architectural and artistic techniques of Byzantine, Islamic and Western traditions and suggested new models of synergy between environment and monument. This new style contributed to the developments in the architecture of the Tyrrhenian side of southern Italy and spread widely throughout the medieval Mediterranean".²

Palermo is also the Italian Youth Capital 2017.

The jury, composed of representatives of the organizing committee (Forum Nazionale Giovani, Anci-Giovani, Agenzia Nazionale per i Giovani and Dipartimento per la Gioventù e il Servizio civile nazionale) and the city of Perugia, Italian Youth Capital in 2016, announced the winning city among the other finalist candidates. The City of Palermo applied with a proposal involving several realities that usually work with the young such as associations, private companies, and the University.

The proposal is structured on five general themes on which activities will turn next year: 'Palermo efficiente e trasparente' (Efficient and Transparent Palermo); 'Palermo città educativa e culturale' ('Palermo, an educational and cultural city'); 'Palermo solidale' ('Palermo, a solidarity city'); Palermo vivibile ('Palermo, a pleasant city to live in'); 'Palermo produttiva' ('Productive Palermo').

Palermo will be the Italian Capital of Culture in 2018 after Mantua (2016) and Pistoia (2017). Thanks to this nomination, the city will receive also one million euro for the realization of the proposal and the exclusion of the resources locked up in the Stability Pact. We can learn from the application form that the City Council approved guiding acts for participatory strategies in 2016/2017. The strategic objectives have been divided once again, into five categories: 'Efficient and Transparent Palermo'; 'Palermo, an educational and cultural city'; 'Palermo, a solidarity city'; 'Palermo, a pleasant town to live in'; 'Productive Palermo'.

"Palermo is like a patchwork: each single element is the expression of different worlds. Over the centuries it has always shown a DNA, an attitude, and a vocation as a place of cultural interfaces. As a city-link, it has been destined to the syncretic realization of intercultural processes; we can see this extraordinary vocation in its landscape, language, monuments, cuisine, and urban tissue. A quadrilingual tombstone kept at the Zisa in Palermo points to this symbolic condition. It is a funeral stele dated 1149 whose inscriptions are in Jewish, Latin, Greek, and Arabic; here we can read the various dating systems in the world testifying the multi-ethnic court during Roger II's reign and the respect for all religions and peoples living in Sicily in those times (...)."³

There is no doubt that these awards and present or future events will be true development opportunities for the whole metropolitan area and Sicily.

In other words, they will bring funds and resources, events and a wide anthropic presence in the cultural field but they will be also precious occasions for business turning on events and initiatives. The anthropic presence in Palermo, tourists and not only, will increase significantly. New works and infrastructures will be realized too in order to regenerate the city and improve its services giving a new image of Palermo, a city finally freed by that unbearable burden made up of criminal records and southern inertia. For this reason the city is under pressure - it is often difficult to sustain it! - acting as a counterpart to optimism and planning to which the city has been longing for so much time.

On the other hand, it is true that the city has always dated difficulties and some of them are true emergencies like a chaotic public and private mobility and a difficult waste management. Even if the whole unresolved problems have not been able to upset a still rich and interesting city like Palermo, they acted as an inner and endogenous disaster. Although they are similar to an instantaneous stress for their limited temporal dimension like a seismic or war event, these issues have acted as a cancer attacking the tissue of this metropolitan reality in all its dimensions. A real disaster or an unlucky star? Misfortune or maybe darkness on the city? Both waste and mobility have a strong influence on the social, cultural, and economic life of the city but they also have a strong impact on its physical reality.

²Application form for inscribing the Arab-Norman Palermo and the cathedral churches of Monreale and Cefalù site on the World Heritage List, December 2014

³ Application form of the city of Palermo for the Italian Capital of Culture 2018 title.

In particular, municipal waste has critical management features with great problems in addition to collection network devices (under private and public management) whose physical presence in the city is often uncomfortable and binding. It happens especially in the old town center of Palermo, an area characterized by a high quality tissue, and typological and morphological relevancies. It is still the recognizable representation of the city. Because of its extension and location, it impacts on the service and mobility dynamics of the whole city; then, in case of cultural and touristic initiatives, it is the ideal scene of these events being so dense and rich in attractors. To regenerate the city and to plan a big event (the latter is now very common in urban governance since an event organization brings various kinds of resources to city tissues such as the old town center of Palermo) are two actions aiming at essential goals like: the preservation of features defining the urban landscape identity and legibility; the environmental impact mitigation of historic landscape due to service management systems and, especially, to MSW; the landscape quality improvement through integrated infrastructure interventions; the attractiveness, use, and value increase of urban heritage through the development of new high performance network services. So, we need possible planning solutions considering the features of each urban space characterized by a specified conformation, infrastructural, technological, and organizational heritage in addition to a waste and resource management strategy of the whole city. Degradation - caused by unsolved technical and environmental issues related to service management - often affects the vulnerability of the old town center features.

The present paper indicates the partial results of a wider research about the relation between cities and their waste collection/processing system; the subject deepened in this paper can be considered as an important part of this relation.

It is clearer and clearer waste issue is not only a problem concerning urban hygiene and health, nor it must be faced only from an economic point of view: nowadays it is a resource to be reprocessed.

It is a problem concerning programming and urban planning too; the latter should not consider waste disposal and collection devices and systems as external elements that are tolerated under normal conditions and outcast in emergency. On the contrary, they should be part of the city equipment and integrated into urban landscape replying properly to both service and user qualitative and quantitative needs, and urban landscape constraints and requirements. More than ever, MSW collection is not just a temporary or permanent placement of devices but also a slow and impacting mobility of specialized vehicles whose type and size are often improper with respect to the historical urban tissue.

So, on the one hand we should consider the vulnerability requirement of the old town center, the whole city and its public and private spaces; on the other hand, we should take into consideration the need to increase the city's resilience aiming at receiving and hosting people in better conditions even if it will always face a flow estimation difficulty. Quantitative and qualitative direct estimation of permanent inhabitants, commuters, students, tourists, cruise passengers, migrants, and other subjects. Indirect estimation of waste amount according to waste quality and heterogeneity modalities, time, and places of waste production and disposal. Recently waste sorting has been proposed and implemented step by step. Anyway, its services have been expecting to define reality paying little attention to the fluctuation of numbers and of users' habits even if their quantitative estimates are correct. This is the reason why waste sorting has not been implemented in the old town center yet, an urban area composed of prestigious but small and tight spaces.

It is fundamental to ask users for their collaboration for a successful service but users should not conform to its limits and constraints being inappropriate. A service for community should conform to users' needs even if the general context is complex or undefined.

To ignore this kind of intent – that is almost axiomatic for the architectural technology and the city - leads to inefficiency and dysfunction.

Our research aims at the possibility to develop tailored design approaches starting from elements connoting urban systems with reproducible and repeatable features.

In order to reach these goals, the actions to be promoted are: short-range circularity, fulfilment of proximity and self-sufficiency principle, development of a service network. Other goals to be reached are: strategies and infrastructures bringing to the reduction of waste (prevention), the reduction of waste fractions quantity at source (organic, paper, glass, etc.) with positive effects on flows and transfers reducing costs, time, and atmospheric emissions, the large diffusion of treatment plants for the on-site waste transformation into a resource (the proximity and self-sufficiency principle).

In particular, each module composing the current search has been developed according to the following steps:

- Analysis of data concerning users and productions of Municipal Solid Waste in qualitative and quantity terms according to the places of production (houses, tertiary sector, schools, tourism, etc.);
- Study of the physical features of contexts, restrictions, peculiarities, infrastructural potentialities;
- Analysis of the waste treatment chains working on separate waste. They have been often subdivided and completed in wide territories precluding any possibility of self-sufficiency and

proximity. Fractions are often transferred to deposits or dumps that are hundreds of kilometres away from the places of collection; in order to be converted into resource, they can be transported also ten thousands of kilometres away;

- Analysis of flows of treated or not treated fractions, identification of the management plans layout for a reconversion of waste into resources in nearer territories. As already underlined, the organic fraction reconversion into compost can take place on site;
- A feasibility theory on integrated urban networks of appliances and infrastructures whose development and features are also applicable on the built environment in terms of integrability. The built environment features nearly always suggest the choice of specified technical and infrastructural solutions.

As already mentioned, we need also to face the waste issue referring to an established historical-urban plant for the 'city-system' preservation in response to the progressive increase of waste production. In addition to contribute to the environmental degradation, this waste increase often alter urban landscape from different points of view: physical, social, cultural, and economic ones. The desire to preserve shared values by this community makes us reflect upon the possibility to find solutions to this problem that could able to integrate with the historical-urban context features.

2. A proposal of a circular management integrated in the old town center

Today cities seem to be a mixed context where available resources are limited while material flows are considerable. Resource flows go through the urban system without paying attention to their origin and destination but following a linear metabolism in which inputs and outputs are mutually independent. The disequilibrium generated by inflows and outflows affects the urban context from an ecological point of view; it also requires sustainable local policies destined to the improvement of the relationship between the city, its community and the environment, above all, where the city functions do not satisfy inhabitants' life standard.

On the contrary, according to the circular process, a city is similar to a living being whose metabolism absorbs energy producing resources in relation to various cycles divided into different functional and temporal scales organized inside a single system through a balanced way.

We should adopt the circular economy in order to exploit the value of materials, labor, energy and capital (products themselves have a capital value at the end of each cycle of use) in a better way.

Global capitalism must make a choice: to create circular systems trying to stop the rising of resources prices or to suffer from their rising costs being conscious their increase is caused by a rooted disposable tendency by consumers on which globalization is founded. Resource flow management can constitute an operational problem with very serious effects on historical areas because of the urban tissues size and the exigency to protect the landscape values. Degradation - generated by unsolved technical and environmental issues related to a service management - often affects the vulnerable features of the historical city. A not circular method, characterized by a resource scarp during waste disposal and processing, often determines alterations in the urban landscape; at the same time, it makes the cultural, economic and social relationships within communities in difficulty. Then, the problem management is closely related to the features of each area marked by a specified conformation and an infrastructural, technological, and organizational heritage.

A true awkwardness is present in a consolidated historical and urban plant in relation to a critical management of solid waste. It is caused by an existing operational difficulty that the other city districts do not have. The morphological singularity of its urban tissue, as well as its intangible, psychological, and symbolic values acquired over the centuries, constitute vulnerable aspects to recognize and appreciate. The desire to preserve shared values by this community makes us reflect upon the possibility to find solutions for this problem that could integrate themselves with the historical-urban context features. However, the circular re-organization of a service - such as the management of material flows - is the ideal opportunity for a landscape regeneration: an old town center is not just a mere protected site but it is involved in circularity becoming a resource, an attractor, and an active component playing an important role for the local economic development.

Both the urban waste linear management and vehicular mobility in the old town center of Palermo present some weaknesses. The reasons are several. Firstly, a delayed modernization of the urban network puts the city at a disadvantage compared to other European urban realities with the same characteristics. Secondly, this inhomogeneous territorial area - owning unique structural and morphological features - has often determined conservative policies that have tried to resolve these environmental issues in an extemporary and prompt way only when these problems could not be put off. Then, in relation to material flow management, the complex relationships between preservation and social dynamics have sometimes caused sector-based initiatives characterized by a little matching reality between city districts and municipal infrastructural systems flow with not very sustainable results: waste collection is still undifferentiated and equipment and devices used are obsolete and polluting (atmospheric and landscape pollution). In order to add other systems and

devices to be used for waste collection and pre-treatment, technical consultants and administrative staff express their decisional power. Anyway, this equipment must meet users' requirements to preserve the physical-environmental context features in which they are used adding new potentials to it. The management of resource flow system and its technology play an instrumental role: they make landscape more attractive and stimulate the relational potentials between community and the area productive ability, and between service performance and optimization of resources increasing the landscape vitality and usability as a whole.

Since waste sorting is fundamental for circular flows, to plan a household waste collection could be a solution for the critical accessibility to inlet points; in this way, it is possible to guarantee the proximity principle to this service for users. Expressing a human dimension of a place to live, this principle encourages collaboration and the opportunity to develop innovative policies meeting inhabitants' requirements and making community engaged consciously. If a management system affected a lower number of users, the area would be under a better control since waste treatment could take place where waste itself is usually produced reducing time and costs for its disposal. The 'domiciliation principle'⁴ must relate to historical context features (operative area difficulties, typological and material characteristics, limited spaces, etc.) and the opportunity of defining hand-delivery 'complementary circuits' (urban collection centers, eco-points, movable delivery points) in order to promote virtuous behaviors too.⁵

The establishment of eco-points or collection areas at secondary façades on the ground floor (center of hand-deliver differentiate waste collection with an economical refund) can become a way to valorize historical buildings, an occasion for expressing users' virtuous behaviors, engagement and civic education. We could obtain these results also through the adoption of movable garbage bins – replacing fixed systems – to be used in areas with a limited number of inhabitants and old town centers. Then, to adopt automatic aspiration circuits could be useful too, once checked its feasibility through on-site surveys.

Generally speaking, when we plan circular systems, it is fundamental to fix specified parameters in relation to operative choices of collection systems such as: fermentation speed causing different constraints in terms of collection frequencies; a specified weight and compressibility requiring the adoption of different vehicles for material collection and transfer; daily consumption; any consumption peak increase after events. Related to circuits for old town centers, contents are very important in the integration of complementary or substitutive systems of the present collection circuit especially in the urban planning of waste concentration and disposal, with proximity collections, and in case of organizational difficulties met in the management of a standard household waste collection because of quantities conferred and contextual features (for example, lacking areas where collection devices can be stored). During this step historical landscape is a resource to enhance so much through a long-term planning led by a systematic vision in which tangible and intangible components are exalted and complementary. In relation to these components, that are unique characteristics of a landscape, some constraints for the preservation of a historical site are determined addressing the decisional choices of any solutions and assessing any possible impacts generated by planned transformations. Being conscious of this requirement, we have to find an assessment method about the landscape impact of resource flow management systems in the old town center of Palermo. This method is based on the use of an informative instrument, that is to say, simulating the planning of a WSA collection plan in an area of the old town center of Palermo, the so-called 'Mandamento di Castellamare'. The experimented methodology is composed of three steps: analysis, hypothesis, and assessment. Each step is indispensable for the development of next one; all of them are complementary.

The **analysis phase** is composed of three specified territorial surveys destined to the acquisition of a complete cognitive framework and choices:

1. **Analysis of an old town center:** it analyzes tangible and intangible components by an old town center in relation to its settlement structure and/or tangible and intangible components acquired over the centuries. This analysis consists of two searches: the first one is composed of a completed document with ordered data, that is a real screening of environmental and technological systems characterizing the historical area; the latter one indicates the landscape quality level assessing the presence of specified observation criteria and their influence grade from a quantitative point of view on the base of qualitative descriptors.

Since intangible aspects can be present in an area under different ways, expressions, and values, the presence of a specific element can affect historical landscape sensibility or quality much more. The more sensitive landscape is, the more identifiable it is; besides, it is much more possible to note any

⁴ Waste is picked up directly at home with integrated systems according to the territorial context type.

⁵ Bibliographical reference: Regione Siciliana, ufficio del Commissario Delegato ex O.P.C.M. 09 luglio 2010, n. 3887, Dipartimento Regionale dell'Acqua e dei Rifiuti, Piano di gestione dei rifiuti solidi urbani maggio 2012. Allegato 6 "linee guida operative per l'ottimizzazione delle raccolte differenziate", page 4

disequilibrium a new transformation intervention can be determine on the existing reality. The analysis is led selecting sub-criteria for macro-criteria such as morphological, perspectival and symbolic; an assessment class is associated to each of them describing the status of belonging to a place and participation in its sensitivity. If some features described by sub-criteria present some traces of the historical and cultural identity of a place, landscape will be more sensitive to changes.

Class	Descriptor	Value
I. Very low sensitivity	The sub-criterion is not so frequent; it does not participate in singularity and organization of urban landscape.	1
II. Low sensitivity	The sub-criterion is not clearly identifiable or it hides among landscape elements contributing partially to the specific identity of urban system.	2
III. Medium sensitivity	The sub-criterion is perceptible and its presence affects the legibility and recognition of landscape quality of an urban system.	3
IV. High sensitivity	The sub-criterion is recognizable and its presence determines the belonging of an urban space to a landscape as a structured system of correlated elements connoted by shared linguistic and formal features.	4
V. Very high sensitivity	The sub-criterion can be found easily and its presence expresses the belonging of urban spaces to one or more systems structuring the organization of an area and a place.	5

Our morphological study underlines the settled plant of the old town center of Palermo through the presence of several free places causing the mixing of public and private spaces where public life has been concentrated nowadays. Urban tissue morphology is composed of a compact and locular net under a dense capillary system made up of streets and alleys with a difficult practicable viability and a complex waste collection system. The old town center is rich in culture and history; there are four historical markets where we can find several historical buildings and lots of irregular shaped public spaces. From a morphological point of view, landscape is recognizable as a structured system made up of elements characterized by common linguistic and formal features making it highly *sensitive* to any new transformations. As far as the perspectival criterion is concerned, the territorial conformation allows considerable perceptive relationships being recognizable from different and panoramic points of the city with lots of landscape and cultural itineraries. The following table is an extract of a much wider analysis file that has been realized according to the following criteria: morphological criterion, perspectival criterion, and symbolical criterion. Some analytical features for the morphological criterion are indicated in the following table.

Morphological Criterion	Presence	ID	Level	Description/notes
Geomorphological features	Yes	MS1.2	4	<i>Legibility of soil stratifications</i>
		MS1.3	4	<i>Morphological plant of the historical urban tissue</i>
Agricultural and naturalistic features	No			
Historical and settlement features	Yes	MS4.1	4	<i>Legibility of the space organization and historical stratification of settlements</i>
		MS4.2	4	<i>Presence of fundamental elements of the historical settlement and its structure: itineraries</i>
		MS4.3	5	<i>Façades of a museum (former nunnery), church, oratory</i>
Witnesses of formal and material culture	Yes	MS5.1	5	<i>Typical and unique stylish solutions</i>
		MS5.2	4	<i>Use of building techniques and specified materials</i>
		MS5.3	4	<i>Treatment of public areas</i>

Criterion	Sub-criterion	ID
Geomorphological	Legibility of soil natural shapes	MS1.1
	Legibility of soil stratifications	MS1.2
	Presence of morphological structures characterizing landscape	MS1.3
Historical – settlement	Legibility of space organization and historical stratification of settlements	MS4.1
	Presence of fundamental elements of the historical settlement and its structure: itineraries, canals	MS4.2
	Presence of centers, private residences, abbeys, castles, defensive walls	MS4.3

From a symbolical point of view, the landscape in the old town center of Palermo is rich in historical and cultural elements recalling public events and religious rites. For several years squares have been a meeting point for the young in the late evening but they also have been a reference point for the

tourist in the morning. An old town center is one of the places expressing the circularity of urban processes⁶; here public and private functions weave together and economical, social, symbolical, and cultural exchange takes place.

2. **Analysis of resource flow management:** it refers widely to the current management concerning uses, services, users, and all the elements involved in differentiated fractions, quantitative estimates and short-term goals that the municipal administration aims at in relation to the current regulations and communitarian strategies.

The analysis of resource flow management targets at verifying the effective circularity of disposed materials. If a circular system – organized according to the flow idea – is not closed, a resource waste takes place in addition to considerable environmental damages and a reduction of earnings deriving from waste sorting or energy recycling whose management should be supported by the municipal administration. This management is analyzed at the current stage according to several aspects that assess it in relation to its performance; some sub-criteria are used in this assessment process assuming a quantitative value.

3. **Analysis of active services:** it describes the current status of services working in a specific area and related to the resource flow management (for example, mobility service is one of the analyzed services whose we study any constraints to vehicles deriving from spatial features and morphological and dimensional site characteristics). The urban plant of a vehicular collection has effects on urban landscape quality in relation to:

- Social welfare: sound emissions produced by vehicles and interference in pedestrian viability through waste loading operations;
- Environmental quality: polluting emissions by vehicles;
- Preservation of a historical landscape: it is consequent to the presence of devices and vibrations caused by heavy goods vehicles and the negative impact generated by loading and unloading waste operations.

If an area is vehicle accessible, the whole effects deriving from the passage of waste collection means and any other type of vehicle amplify potential damages on urban landscape.

The described analysis plays an important role in the **hypothesis phase**. During this step operational scenarios are defined in order to improve the current status. Three different scenarios have been individuated where it is easy to find the gap between the present flow management status and the ideal state of continuous waste disposal in respect to the hypothesis based on the direct flow destination to a pre-treatment center.

The second scenario is a sort of intermediary solution that has been taken into consideration in order to reach the ideal waste collection goals but using different operative and structural methods. This intermediary solution has been already activated in some urban districts; the city council has programmed its activation in the old town center too. The second scenario could be implemented rapidly; it should be activated during the organization of events mentioned at paragraph no. 1.



Figure no. 1: From the planimetry representing the current status of waste collection in an area of the old town center of Palermo (the so-called 'Mandamento Castellammare'). Planimetry by Elvira Nicolini

Today we have individuated few containers for waste sorting (bottle banks and other containers for metals) several hundreds of meters away from each other. Waste collection is mainly undifferentiated; the waste sorting collection is managed by a van along larger streets and a small trash compactor for

⁶ Franklin R., Kourtit K., Nijkamp P., Rodriguez-Pose A., "A blueprint for strategic urban research: the urban piazza", in PMC US National Library of Medicine National Institutes of Health. 23rd January (2014).

smaller alleys. During collecting and transferring operations, these vehicles emit a huge quantity of pollutants in the air and block up the area characterized by limited and badly ventilated spaces. With the second scenario, 'door-to-door' system is mostly used. In this case waste is collected directly at home where differentiate fractions of paper and carton, plastics, humid fraction (organic waste) and not recyclable residual fractions are collected in addition to glass fraction collected through common bottle banks. This project is characterized by the use of a 'domiciliation' system with less bulky movable devices, eco-points, or small collection centers that could be integrated on the ground floor of all buildings.

With the third scenario we have an automatic aspiration collection system. Through an air flow aspiration, this system transfers material flows from their origin points to a terminal collection station through an underground piping system; the final collection center is located at strategic urban areas where it is possible to sort out these flows. A network links the collection station with inlet points consisted of collection trapdoors and a vertical pipe connecting to the intake valve of the main pipe. The following planimetry shows these inlet points, a piping network and the collection stations studied.

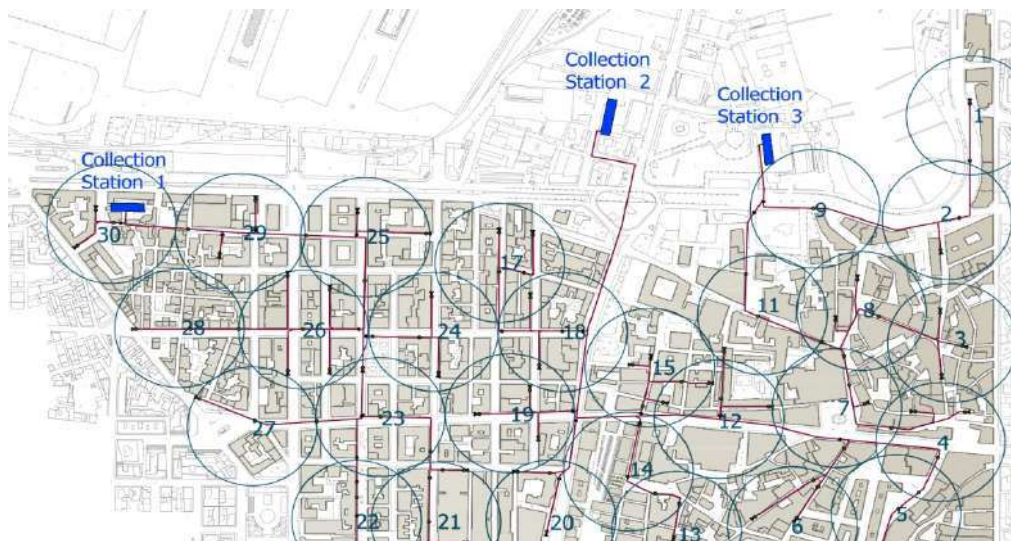


Figure no. 2: From the planimetry representing waste automatic aspiration plant (inlet points, pipes, and collection stations). Planimetry by Elvira Nicolini in collaboration with Envac Iberia SA

The **assessment phase** aims at evaluating the impact generated by a new planning approach and any chosen technological systems in a such complex context. The impact assessment is correlated to the analysis on the definition of landscape sensitivity class of a site. From this analysis it is possible to find some elements that – even if consolidated over the centuries – could be vulnerable at the same time being tarnished in one or more dimensions. These scenarios are evaluated through some impact sub-criteria whose goal is to guarantee in advance if the occurred transformations – that are mandatory for their realization – could change the existing site and any tolerance level. In order to compare these scenarios, criteria are hierarchized creating a mathematical binary comparison model giving a square and symmetric matrix in relation to the main diagonal line. This matrix is defined according to the Analytic Hierarchy Process (AHP)⁷ that establishes an importance order to criteria; each of them is ordered according to a preferability principle. To prefer a criterion against another one is a consequence of the previous study about the reference historical landscape and preliminary hypothesis related to the impacts that could be generated in relation to each criterion.

Processing of results: From this binary comparison we can see door-to-door system and automatic aspiration system have several benefits for the prevention of the historical urban landscape. In relation to the morphological dimension, the second scenario is limited from the visual point of view during the exposition of disposal devices if not located in a hidden place in case of delays in collecting waste or an increase of waste beyond the planned limit.

The present status can damage considerably the relational continuity of historical and cultural landscape features. Generally speaking, automatic aspiration system has good effects but it is important to pay attention to the plant components installation.

The environmental assessment indicates a gap between the current status (undifferentiated collection) and the waste sorting solutions concerning greenhouse gases emissions with a 70% reduction. We

⁷Saaty, T.L., 1980. "The Analytic Hierarchy Process." McGraw-Hill, New York

can obtain a 98% reduction of emissions through an automatic aspiration system; in this case, vehicles are used only partially in the historical area. As far as transfers are concerned, door-to-door collection could guarantee some disadvantages due to the increase of disposal points; on the other hand, the results with differentiate fractions will compensate these negative notes. The following data sheet is about 'door-to-door' solution.

DATA SHEET NO. 3.1 Assessment of impact level on urban historical landscape				Scenario 2
Dimension	Presence	ID	Level	Description and/or notes
Morphological features	Yes	CM2	3	Possible changes in the linearity of streets because of the alternation of exposition/ collection of disposal devices at public areas
	Yes	CM3	2	Slight modification of urban section profiles for the introduction of devices
	Yes	CM4	5	Slight modification of inner volumes of ground floors for locating inlet points when they are not located at public areas.
Relation features	Yes	CR1	3	Possible modification of architectural relationships during the exposition of devices and waste collection
	Yes	CR3	4	Possible modification of cultural and historical relationships in case of an increase of waste quantity
	Yes	CR4	3	Modification of the street continuity during waste collection and transfer to treatment plants
	Yes	CR6	4	Building entrances obstructed during waste collection; devices allocated next to building entrances
Visual features	Yes	CV1	4	Overview interruption during device exposition
	Yes	CV3	2	Interference with points of interest and itineraries during waste collection
	Yes	CV5	3	Devices for waste disposal at historical and monumental places with the consequent concealment of perspective visions

Another positive benefit is the interface with users. Waste sorting collection, organized through integrated systems, could involve citizens in the regeneration of spaces.

Some disadvantages emerge in relation to the maintenance of automatic aspiration system; it is necessary to intervene under the soil causing a consequent setting-up of construction sites and safety works involving the whole area.

As far as economical assessment is concerned, the investment payback time is calculated dividing the cost estimated for the implementation of each solution for the difference between earnings deriving from the analyzed scenario and earnings deriving from the current management. Compared with the current annual management earnings, the proposed solutions esteem the following annual earnings: 19% for door-to-door solution and more than 150% for automatic aspiration solution. These earnings could be an economic incentive both for the municipal administration and the city community that could participate together in the development of the resource flow circular process. The following table shows a comparison among the three scenarios according to the individuated criteria.

Dimensions	Criteria	Present	Door-to-Door	Automatic
Percentages of preferability				
Morphological	Morphological features	4	3,6	4,8
	Typological features	2,4	2,6	3,6
	Relational features	1,8	2,5	6,4
	Visual features	0,8	1,7	6,0
Percentages of preferability				
Environmental	Sound impact	3,1	1,7	2,6
	Odour impact	1,1	3	7,9
	Atmospheric Impact	0,7	0,7	5,7
	Emissions- residual quantities (kg CO2eq/year)	12.136.500	3.678.750	3.678.750
	Emissions- collection and transfer (kg CO2eq/year)	335.435	453.685	9513
	Percentages of preferability			
Social	Symbolic perception	0,6	2	6,4
	Interface with users	0,7	5,4	7,2
	Service management	4,7	1,8	3,4
	Investment cost expressed in €	0	3.877.485	17.880.166
	Difference costs-earnings from annual management expressed in €	-2.428.430	-1.974.080	1.377.332
	Investment payback time (year)	0	0	5
	Landscape impact class		IV	II

3. Conclusions

Events and development occasions related to the awards assigned to Palermo in the following years could make this city one of the most visited Italian touristic places. As a consequence, some urban areas – already limited for their morphological nature – could result congested. Resource flow management – if not well planned – could be an emergency threatening the integrity and identity of the old town center of Palermo that is as rich as vulnerable. Resource flow circularity can be the reply to waste emergency and its planning can become an occasion to regenerate landscape; the latter is not just a mere protected site but it is involved in circularity becoming a resource, an attractor, and an active component playing an important role for the local economic development.

In a few words, urban space – even if equipped with technical plants that are necessary and adequate for the foreseen functions – must respect landscape elements, and environmental standards and let community to continue with its daily life and socializing, recreational, working, and touristic activities also in case of an increase of urban flows.

Experimentation is a repeatable method for evaluating ameliorative or pejorative incidence resulting from a new planning approach and devices chosen and applied in a complex context like the old town center of Palermo. Intervention must take into consideration requirements expressed by the site itself in order to improve its external image without losing its original identity and, at the same time, integrating with the existing parts. To regenerate the inner value of a place means to activate its ability to represent a symbol of common features shared by the whole community over the centuries. An efficient project considers these aspects through different disciplines and presents a result deriving from a systematic analysis of descriptive variables of a specified context in which we should intervene. It is a resource to enhance through a long-term planning and led by a systemic vision where both tangible components (technologies and infrastructures) and intangible components (socio-cultural identity and relational factors) are boosted and complementary. The resolution to such a problem – especially in a consolidated urban and historical plant – is necessary for the preservation of the 'city system' where the historical and identity value is a consequence of a physical recognitive process.

Bibliographical References

[1] EUROPEAN COMMISSION. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. *Towards a circular economy: a zero waste programme for Europe*. Bruxelles, 2014

[3] CANNAROZZO, T., Sicilia: centri storici come periferie. In *Urbanistica Informazioni* n. 208, Rome: INU Edizioni, 2006, pages 23-24

[2] FATTA, G. (a cura di). *Palermo Città delle culture – Contributi per la valorizzazione di luoghi e architetture*. 1ª ed. Palermo: 40due Edizioni, 2014. ISBN 978-88-98115-XX-X

[4] MAGNAGHI, A. *Scenari strategici: visioni identitarie per il progetto del territorio*. Florence: Alinea Editrice, 2007. ISBN 978-88-6055-1

[5] MAMI', A. Circular processes for a new urban metabolism: the role of municipal solid waste in the sustainable requalification. In *TECHNE*, Rome: FUP, 2014, page 171.

[6] PINTO, M.R. *Il riuso edilizio, procedure, metodi ed esperienze*. Torino: UTET, 2004. ISBN 9788877508843

[7] REGIONE SICILIANA. Dipartimento Regionale dell'Acqua e dei Rifiuti. *Piano di gestione dei rifiuti solidi urbani maggio 2012. Allegato 6 "linee guida operative per l'ottimizzazione delle raccolte differenziate"*. Palermo. 2012, page 4

[8] REGIONE LOMBARDIA. *Linee guida per l'esame paesistico dei progetti previste dall'art. 30 delle Norme di Attuazione del Piano Territoriale Paesistico Regionale (P.T.P.R.) approvato con D. R. 6 marzo 2001, n. 43749*. Milano: Bollettino Ufficiale della Regione Lombardia, 2002, Pag. 3

[9] SAATY, T.L. *The Analytic Hierarchy Process*. New York: McGraw-Hill, 1980. ISBN 9780070543713

[10] UNESCO. *Recommendation on the Historic Urban Landscape. UNESCO World Heritage Centre, Resolution 36C/23*, Paris. 2011

[11] VIOLA, S. *Nuove sfide per città antiche*. Naples: Liguori Editore, 2012. ISBN: 88-207-6037-1