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Article

The Classification of Urban Uses

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Abstract: The classification of uses is one of the central issues of urban planning, since it is only by referring to groups of uses that we can achieve the simplification and, ultimately, the understanding of urban space. However, contemporary planning theory has shown very little interest in a theoretical approach to this issue. The present paper addresses the issue by integrating it into the development of an analytical theory of urban uses which it calls urbanology. Specifically, the paper starts with the description of the basic concepts and processes of classification, which are then employed to produce a general theoretical classification of urban uses. Since the classification of uses is not only a question of theoretical importance, but directly related to applied planning, the paper concludes with the elaboration of a second, alternative classification which satisfies the needs of contemporary planning practice.

Keywords: urban use; land use; use class order; classification; taxonomy; typology

1. Introduction

The fact that urban and regional planning are applied fields does not imply that they are exempt from any recourse to theory. What is known as planning theory revolves around planning methodology, which is concerned with the applied domain, but there are also other kinds of theory, not of a technical nature but analytical and scientific. The scientific background to planning, which might be called urbanology and regionology, has not yet been formulated, but it is clear that it should be founded on the concept of urban use. This leads to two necessary steps: the definition of this concept, and the classification of urban uses, the necessary background for any analysis of or intervention on space.

A well-formed classification should reveal actual spatial organisation and allow coherent proposals, both of which are only partially achieved with empirical, intuitive classifications. Given that our starting point is the experience from Greek planning, we shall use an example from Greece. In the first legislation on specific urban uses in 1980, 28 use types are numbered consecutively [1]. In this one-level, non-hierarchical classification, manufacturing and industry are presented as a single use type; “shops” (that is, retail trade) are given the number 2 and wholesale trade the number 17, without their grouping under the category of trade; petrol stations are put on the same level as manufacturing and industry and “administration”, etc. Then, while enumerating the uses allowed in one of the 11 kinds of spatial zones given, reference is made to “shops corresponding to the everyday needs of their immediate area of influence”, which appear independently from number 2 and without the mention of other groups of retail trade. A recent law of 2014 on urban uses [2] enumerates many more uses and seems to be based on the Greek equivalent of the international classification NACE Rev2 (see below Section 4). However, in defining the uses in one kind of zone, the law lists “offices” as number 1.7; the definition of another kind of zone groups “offices” under this number together with banks, insurance and social services; in a third zone, this group of uses appears as number 1.8.

Obviously, the uses were not given a specific code number from the beginning, something that would indicate the need for a complete and systematic tree-structure of uses (see below Sections 3 and 4). Flaws of this kind are not a particularity of the Greek planning system, but are structural in all empirical classifications.

Empirical classifications are not, of course, nonsensical. They are based on practical know-how, the fruit of experience and trial-and-error, and have guided professional planning practice for decades. Many of them are good pieces of professional craftsmanship. The purpose of this paper, however, is to go beyond craftsmanship, to a scientific approach that would give us a metalanguage on existing and possible craftsmanship. While the economists have such a systematic guide, there is no similar guide for planners.

The classification of urban uses must start with a theory of urban uses, on the basis of which their systematic classification will be possible, providing the foundation for planning operations. J. Brian McLoughlin was clearly aware of the importance of such an approach when he wrote of the need for a typology of land uses which “should deal with activities only—a ‘pure line’ classification”. He gives a few ad hoc examples of typology taken from professional practice and proposes the Standard Industrial Classification as a guide for land-use typology [3] (pp. 129–133), see also: [4] (p. 323). This paper attempts to provide concrete general lines for such a classification, on the basis of classification theory.

According to Kenneth Bailey [5] (p. 1), “classification is a very central process in all facets of our lives. It is so ubiquitous that not only do we generally fail to analyse it, we often even fail to recognize its very existence”. Indeed, the need for a ‘filtering’ of the fragmentary and complex empirical world, in order to bring out the essential and discard the inessential, means that the process of classification is our basic mechanism for understanding the world. Often the mechanism operates unconsciously and imperceptibly, with the result that it is difficult to distinguish the criteria that were applied in the process of classification. This lack of clarity appears to be the rule in the classifications of urban uses, since in most cases the process which was followed and the criteria which were applied remain implicit and empirical, something which makes it difficult to evaluate and improve the resulting classifications. We note that the concept of urban use coincides with that of regional use, since there is no break in continuity between urban and regional analysis and planning [6] (p. 20). In the present paper we will refer to urban uses for the sake of simplicity, but we do not wish to imply that the term should be limited to urban analysis; it can equally well be applied to a regional approach.

The classification of uses is one of the central issues in urban planning, since it is only by referring to groups of uses that we can achieve the reduction of the complexity and, ultimately, the understanding of urban space. Different classifications lead to different analyses and interpretations of urban space and, in the end, to different conclusions concerning it, conclusions which have a direct impact on the types of intervention proposed. It is odd that an issue as central as that of the classification of uses has been of so little interest to contemporary planning theory, although it was a favourite topic in the field of human geography from as early as the 1930s up to the mid-1970s [7–12]. There is a valuable bibliography in Greek on the classification of urban uses, which we will be referring to below, but the systematic theoretical development of the issue is due to the work of Alexandros Ph. Lagopoulos [6,13,14], who in addition contributed to the construction of the appropriate scientific terminology and conceptual infrastructure necessary to validate a classification of urban uses; the article that follows represents a further step in this direction.

The concepts which permit the description of the process of classification of uses are as necessary as the concepts which permit their scientific study. The following two sections of our paper will therefore be devoted to a review of the theoretical framework of classification, while the last section will use this theoretical framework to focus on the issue of the general theoretical classification of urban uses. We will also discuss alternative classifications within the context of the above.

2. The Concept of Classification and Basic Related Concepts

Classification is defined as the investigation of the characteristics of certain objects in order to determine if and in what manner these objects may be grouped into a limited number of classes, on the basis of the similarities of the characteristics studied [5] (p. 1), [12] (pp. 326–327), [15] (p. 1). Classification is a complex process which serves a number of purposes, the most important of which is the reduction of the complexity of a system [5] (p. 12), [12] (p. 326). Without this process we would be unable to communicate with our environment, since the empirical world is a source of infinite information, which must necessarily be filtered in order to make apparent its basic structure. Classification is precisely this process of selection and foregrounding, through the grouping of objects on the basis of the formulation of significant common qualities, while at the same time their other qualities are excluded. In every case, classification is a process of generalisation and simultaneous simplification. At the same time, classification involves the imposition of an organisation on the objects concerned [5] (p. 13), [12] (p. 326). Objects which were disordered are ordered, finding their place in particular categories.

The term classification is used to describe both the process and its final result. The use of the term implies that the number of categories produced, the characteristics that distinguish one category from another and the inclusion of specific objects in each category are all objects of study. According to Bailey [5] (p. v), there are two basic approaches to classification: *taxonomy* and *typology*. The term taxonomy is often used instead of the term classification, but implies a greater emphasis on the hierarchical organisation of its objects [5] (p. 6), [16] (p. 26). In this paper we also prefer the use of the term classification, instead of taxonomy, as the former term is more prevalent in the field of urban planning.

Basic to the concept of typology is its conceptual character [5] (p. 4). In contrast to taxonomy, where the objects to be classified are empirically given, typology is concerned with the classification of theoretical, usually conceptual objects. The categories produced by a typology are types, which constitute new objects or concepts. For example, Table 1 below presents a typology based on two variables (intelligence and motivation), which leads to the creation of four types. This typology is created independently of the existence or not of empirical data and is in itself theoretically interesting.

Table 1. A hypothetical fourfold typology [5] (p. 5).

	Motivated	Unmotivated
Intelligent	Success	Underachiever
Unintelligent	Overachiever	Failure

Classification has one characteristic which differentiates it completely from all other methods of creating groups; these methods will be briefly mentioned below, since they are not used in the present paper. Each classification is created in order to serve a specific purpose, in other words is created according to a plan. For this reason, its final product is a structural model, since all the groups created have direct or indirect logical relationships to each other, in other words the groups are ordered according to a total structure external to them. Also, the groups created are homogenous, that is, they have an internal structure. In contrast, *clustering* or *grouping* is a process of creating groups which takes place with no specific purpose and where the groups produced, if logically related to each other, are so only by chance, in other words the external structure mentioned above is missing. Of course, we should mention that classification often relies on clustering techniques as its first steps. Indeed, “taxonomic schemes have to begin somewhere, and their beginnings are not unlike clustering” [17] (p. 344). According to David Harvey [12] (p. 328), clustering in its first stage is an intuitive process, which is then systematised through the analysis of the groups and the discovery of the common characteristics shared by the objects in each group. Such an intuitive grouping of objects is the only available option when we attempt to classify certain objects, of which there is no previous analytical

knowledge available. A third process of group creation is *indexing*, in which there is neither a total structure of the groups produced, nor homogeneity within each separate group [17] (pp. 334–335).

3. The Process of Classification

The process of classification, though it is fundamental for the social sciences, is rarely the object of theoretical analysis. It is usually considered an empirical process, difficult to describe or carry out in a systematic manner, and hence to be judged by its results. The latter is undoubtedly true, however, it does not justify the systematic omission of the logical process followed by various scientists in the production of their classifications, a fact which renders exceedingly difficult their evaluation by later users. Of course, a process of classification need not spell out common criteria which are used in all cases, however, it is a rule-governed scientific process, and the present section focuses on the presentation of these rules, in order to apply them to the case of urban uses.

One such necessary rule is that in a general classification, the groups or categories created must be exhaustive and mutually exclusive. This means that, if we wish to classify N individuals, then: (a) there must be an appropriate group for each individual (*exhaustivity*) and (b) no individual can be a member of more than one group (*exclusivity*) [5] (p. 3). In other words, there must be one and only one group for each of the N individuals. Indeed, exhaustivity and mutual exclusivity serve the basic effective purpose of any classification, which is to achieve: (a) the greatest possible homogeneity of the objects within the groups (*within-group homogeneity*) and at the same time (b) the greatest possible differentiation between groups (*between-group heterogeneity*) [5] (p. 1), [11] (p. 327), [14] (p. 3). It should be noted that in the social sciences we rarely find cases of intentionally constructed overlapping classifications, that is, classifications where some groups have some, though not all, objects in common.

It is clear that both the similarities between the objects of a particular group and the differentiation between groups are the result of the study of certain characteristics which the objects to be classified possess or lack. Of course, any actual object has unlimited qualities and characteristics (due to the different perspectives from which it may be studied), only some of which are used to relate it to other objects in order to create groups. As a result, a set of objects can be organised into categories in more than one way. In a general sense, every scientific field tends to create a generalised visual classification (which of course does not necessarily remain unchanged over time), at least in the context of one of the theories in the field; but in any case, all the theories within a field are subject to the original epistemological perspective which defined it as a specific field of knowledge, as a result of which a kind of general intellectual climate is imposed within the field. That is the theoretical view of classification. There is also an empirical, or rather empiricist, view, according to which each organisational proposal is evaluated positively or negatively according to how well it corresponds to the needs of each particular case [5] (p. 2), [8] (p. 300), [12] (pp. 326–327). In this view, for every classification we must specify the goals which it is meant to serve and translate these goals successfully into specific classification criteria [10] (p. 588). This is an idiosyncratic approach which deliberately limits itself to a specific case, rejecting the possibility of generalisation. In the case of urban uses, classification takes the form of taxonomy, since it concerns empirical objects. Thus, the general theoretical classification of urban uses is clearly grounded in empirical facts, but transforms these within the framework of theory.

Even after the choice of specific classification criteria, doubts often appear concerning the group in which a particular object should be classified. In some cases, the objects have characteristics or qualities which make them appropriate for more than one group. At this point the researcher needs to choose whether to create *monothetic* or *polythetic* groups. A group is monothetic if a series of qualities (or more usually only one quality) is both necessary and sufficient for an object to be included in that group [18] (p. 20). For the formation of a monothetic group it is not necessary to know the objects to be classified, since the groups are created on the basis of the qualities which the objects which are to participate as members of each particular group must have [11] (pp. 328, 337). In contrast, polythetic groups are those in which the objects which constitute them share a series of common qualities, but no one of these is either necessary or sufficient for an object to become a member of the group in question [18] (p. 21).

In the case of polythetic groups, prior knowledge of the set of objects to be classified is necessary in order to make possible the study of their characteristics and the choice of the appropriate classification criteria. Because of the impossibility of defining the qualities which are necessary and sufficient for the inclusion of an object in a polythetic group, the objects which constitute each group must be listed [12] (pp. 328, 337). As we understand from the above, a typology is based exclusively on the construction of monothetic groups. On the other hand, taxonomies and clustering techniques can include both monothetic and polythetic groups, although in practice they are usually based on the latter.

The process of classification itself may be achieved in two ways: (a) *top-down* or *deductive classification* and (b) *bottom-up* or *inductive classification*. These two basic approaches are directly related to the two types of groups discussed above, monothetic and polythetic groups, respectively. A deductive classification is the result of consecutive logical subdivisions of the population of objects to be classified. At each step, one or more criteria are used to differentiate the groups, resulting in the end in a tree structure of monothetic groups. The deductive method may be used in taxonomies, but it is only in typologies that it constitutes the exclusive method of creating groups. The criteria usually chosen are antithetical or complementary in nature (f. ex., public vs. private means of transport, or land vs. air vs. sea transport). Deductive classification is particularly dependent on the criteria used and the order in which they are applied. A mistaken criterion or a wrong order of application in the early stages is enough to distort the whole classification. Generally, deductive classifications should be tried only when there is a very good knowledge of the objects to be classified, or, better, a theory which specifies the criteria and the order in which they are to be applied [12] (pp. 336–337).

Inductive classification, on the other hand, uses clustering techniques in order to organise into groups an existing and finite population of objects. Like deductive classification, inductive classification can arrive, through consecutive consolidation of groups, at a tree structure of monothetic or polythetic groups. The groups which result from an inductive classification are usually polythetic [18] (pp. 22–23). Deductive and inductive classification are methods or approaches to the process of classification, not different kinds of classifications (in the sense of the final product). In general, once a classification is complete, it is difficult for a third person to recognize the approach by which it was created, unless it is explicitly stated. Usually, classifications in the social sciences are the result of a mixture of the two approaches: one part, obviously the higher one, results from a deductive classification, while the rest from an inductive approach.

The majority of the classifications (as final products) encountered in the social sciences are vertically hierarchical classifications presented in the form of tree diagrams, which is why they are called *tree-structured classifications* or simply *trees*. The lowest level of such classifications consists of the elementary objects to be classified, the set of which is called *first order classes*; the category which includes a set of first order classes is called a *second order class*, and so on [19] (p. 68). The highest-order class is called the *parent* or *root* of the classification and is identical to the theoretical concept which defines the fitness field under study, while each first-order class is called a *leaf* [15] (pp. 69–74). A class together with the lower-order classes into which it is divided constitutes a *branch* of the tree.

It is important to note that tree-structure classifications can be divided (decomposed) into partial classifications and thus adapted to the particular needs of a study, whether theoretical or applied. Such a division or decomposition may be either vertical or horizontal. The vertical decomposition of a tree is easily achieved through the isolation of all the levels of one or more of its branches. A horizontal decomposition, on the other hand, may be achieved only if the tree is organised into levels of consecutively greater specialisation, in other words if it is transformed into a *ranked tree*. The term *levels of specialisation* is used for those horizontal levels of a classification, the classes of which show a similar degree of specialisation in relation to the parent of the classification. If, in the construction of a ranked tree, there is no category on a particular level of specialisation of some branch, then on that level is placed the class of the immediately higher level of the same branch. The choice of one or more levels of specialisation for a particular study leads to the horizontal decomposition of the tree.

4. The Classification of Urban Uses

The theory of classification presented in the previous section allows us to identify both the basic and unavoidable limitations which accompany any classification and the specific qualities which are desirable in the classification of urban uses in particular.

As noted in the previous section, a classification can be constructed either top-down, on the basis of successive logical subdivisions of the population of objects which are to be classified, or bottom-up, on the basis of successive groupings. However, the classification (i.e., taxonomy) of urban uses is not usually either purely deductive or purely inductive, but is the result of a combination of these two approaches. A first guide to an exhaustive inventory of the unitary types of urban uses, which however is based on economic and not functional criteria, is the NACE Rev2: Statistical Classification of Economic Activities in the European Union [20]. A classification of this type relies on a bottom-up approach to classification. On the other hand, urban planning practice during the past decades has been associated with the economic theory of economic sectors and branches, resulting in a relative stabilisation of the features of the wider functional groups; this allows for a top-down approach to classification through their first subdivisions. As we see, both the higher level and especially the lowest level of the classification are fairly precisely determined, a fact which leads us to focus our interest in the present paper on the middle section of the classification, parts of which it may be possible to determine deductively, by subdivision of functional sets, while others may be found inductively, through the consolidation of unitary types.

As we saw, a basic limitation which applies to the majority of classifications found in the social sciences is their hierarchical organisation. In graphic representations of hierarchical tree classifications, there is a clear connection of the unitary elements of the lowest and most analytical level, i.e., the leaves of the tree, to the wider categories of its higher levels. In the classification of urban uses, the leaves are the *unitary types of urban uses*, the smallest units of urban planning, which cannot be further subdivided. These unitary types are organised into successively wider sets of uses, until the repeated consolidation of these sets ends in the construction of the *urban categories* which are the widest possible sets of uses. Even more general sets of uses may be constructed if we look beyond the urban planning perspective on uses, for example on the basis of the perspective of economics, which organises a large set of uses into the groups of the primary, secondary and tertiary sectors of the economy.

Clearly, the decision to focus on the middle section of classes which mediate between the unitary types and the urban categories is to some degree a matter of choice, although limited by the prescriptions of theory and the needs of practice. But it is nonetheless a theoretical construction, with claims to general validity. Specifically, we propose the creation of three intermediate classes: those of *subcategories*, *groups* and *sub-groups*. For example, the subdivision of the category of retail trade leads to the creation of the subcategories of general retail trade and trade in services. The subcategory of general retail trade in turn is divided into the groups of daily, occasional and infrequent trade, and daily retail trade into the sub-group of retail trade in food and beverages, and the sub-group of other daily retail trade.

Apart from the necessary characteristic of hierarchical organisation, it is desirable that the classification of urban uses be organised into the above levels of specialisation, to allow its users to choose between a more analytical and a more general approach to urban space. In such a classification, all the elements which are found on a particular level are equally general or equally specific in relation to the leaves and the root of the tree, respectively. In the case of urban uses, this means that each defined level of specialisation must contain sets of uses (categories, subcategories, groups and sub-groups) that are all equally general or equally specific.

However, we should note that the subdivision of an urban category does not necessarily lead to the creation of groups of the immediately lower order (that is, sub-categories). Instead, the subdivision may lead directly to the creation of groups or sub-groups. This is because the use groups on each level of specialisation need to be mutually comparable as to their degree of generality or specialisation. The choice of the appropriate level of specialisation on which each set of uses is located depends on

the empirical perception and estimate of the researcher, unless theoretical criteria have been found that would allow the theoretical substantiation of these choices.

In addition, two basic requirements of any classification of urban uses, as indeed of any classification, are the exhaustivity and the mutual exclusivity of the uses to be classified. The first requirement demands a complete inventory of the unitary types of urban uses, as we mentioned above. The second requirement specifies that no unitary type may belong to more than one set of uses, that is, each unitary type of urban use must be a member of one and only one set of uses. This requirement is simple, technically speaking, however, because of the multidimensionality of urban uses, it leads to a series of critical classificatory decisions. In particular, it leads to the choice of the nature of the use as the most basic criterion in the original determination of the unitary types of urban uses, a criterion which is also fundamental during their organisation into categories, as we will see below. For example, the original separation of hotels and motels into different unitary types leads to the classification of the former in the category of recreation and of the latter in the provision of accommodations.

As we saw in the previous section, in the case of both monothetic and polythetic sets, specific criteria are used for the determination of the sets of uses. These criteria must be explicitly stated and accompany the classification, since in the case of monothetic sets they are a part of the definition of the sets, while in the case of polythetic sets, reference to them is necessary in order to determine the nature of the groups with exactitude rather than empirically and approximately. Thus, a basic requirement of each proposed classification is that it should present and document the criteria which were used to define its classes. There is no classification of urban uses which has not been preceded by a—probably invisible and unconscious—process of selection of certain criteria for the formation of the classes, even when the process is empirical or gradual. This is why it is necessary to bring to light these criteria and state them explicitly, so that it becomes possible to evaluate and critique them. Indeed, as will become evident immediately below, in a classification of urban uses it is possible not only to present these criteria that lead to the formation of either monothetic or polythetic groups, but to assess them in order of their importance.

Specifically, the most important classification criterion is the *nature of the use*. The determination of the groups in the highest-order level is based entirely on the application of this criterion and leads to the total organisation of the uses. Ultimately, there are as many urban categories as there are distinct socio-economic practices that can be identified in a contemporary society. The differences in the nature of urban uses may be obvious (as for example in the distinction between manufacturing and trade) or they may be small and difficult to discern (as for example in the case of the trade in services, which as evident from its name balances between retail trade and services).

As we know, an urban use is rarely simple and uniform. Usually it consists of a set of partial uses, of which one is its primary function and the others secondary or auxiliary functions. The latter, though secondary, may compose a significant part of the whole, so that it is the sum of the primary and secondary functions that determines the character of the use. One such example are hotels, the primary function of which is the provision of accommodations, but which may also include recreation, trade and services, in other words a variety of functions which constitute an intrinsic element of their character. It is clear, then, that the classification of an urban use cannot be based exclusively on its primary function, since the application of the criterion of the nature of the use expands to include all of the partial functions which compose the use as a whole.

The second most important classification criterion is the *functional relations* between uses. The study of the functional relations requires knowledge of the flow of users between uses, allowing us to determine the functional circuits and the dependency relations between uses. These relations are central to urban planning, since they are the force behind the creation of spatial patterns, the recognition of which is the fundamental goal of any urban planning analysis. However, the study of functional relations is limited by the lack of data concerning the flow of users. As an alternative, though a purely empirical and approximate one, we may use the nature of the product or the service which is produced, provided or offered by an urban use to organise the uses into groups, on the

basis of the hypothesis that because of the similarity of their products or services, these uses maintain strong functional relations with specific other urban uses. For example, the uses involved in the manufacture of electrical and electronic appliances could be grouped into a single set of uses, since they participate in the same productive and inevitably also functional circuit, making use of the same sources of primary materials and basic services, as well as common middlemen and final recipients of their products.

The third most important criterion for the classification of urban uses is that of the *frequency of use*. The frequency with which users approach an urban use in order to employ its services is directly related to its location, something which makes this criterion especially valuable. In general, the uses which are most frequently approached by the inhabitants of a settlement are located next to housing areas, while uses which are more rarely employed are located mainly in the centre of the settlement or along major arteries. For example, the specialisation of retail trade into daily, occasional and infrequent is based on the application of the criterion of frequency of use. Linked to the frequency of use is the radius of the catch area of an urban use, which can be used instead of the former.

A fourth criterion is the *size of the use*, which can be measured either based on the number of employees of the use, or on the basis of the surface area it occupies. This criterion is low on the scale of importance, since changes in the size of a use do not necessarily lead to functional and classificatory differentiation.

As we have seen, these four criteria are used to classify uses into urban categories, sub-categories, groups and sub-groups. The organisation of uses into sets larger than the urban categories, that is, into super-categories, is useful and in many cases necessary, but lies outside the relevance of urban planning, since the criteria used are not urban-planning criteria. Some common classifications at this level are: (a) the economic organisation of the urban categories into the three sectors of the economy, which is not an exhaustive classification, since it leaves out the uses of housing, infrastructure nodes, green spaces and sports installations; (b) the sociological organisation of urban categories into productive activities, public utilities and housing [3] (p. 174); and (c) their socio-planning organisation into housing, recreation, work and transport [21]. The fact that these classifications are based on criteria from outside the relevance of urban planning does not mean that they are of no value to planning. Indeed, it is customary planning practice to use mixed socio-economic criteria to consolidate the urban categories into groups more easily manageable for statistical analysis and cartographic representation. At the end of this paper we will attempt such a super-classification.

In order to proceed to a systematic classification of urban uses, we chose a specific strategy. NACE Rev2 offers the most detailed classification, but has an *economic* orientation; nevertheless, it is extremely useful given the close connection between economic activities and urban uses. A purely *functional* classification was elaborated by Lagopoulos, first formulated in [6], followed by later revisions, partly due to the development of urban uses over the last decades, though it is much less extensive than NACE Rev2. This functional approach has been tested for many decades in both planning proposals and the classroom. It was further developed in a recent study [22], using the criteria discussed above and proposing the classification of urban uses into the 21 urban categories which we present below. This study was not, of course, based only on theory, but was also informed by concrete national and international data on use classifications.

Greece has a considerable tradition in this field, which we consider worth mentioning: (a) the classification used by the Athens Center of Ekistics in its series of studies of the Metropolitan Area of Athens under the title *The Human Community* [23], carried out under the supervision of Constantinos Doxiadis; (b) the classification used by Agni Markopoulou and her partners for the study *Urban Standards* [24,25]; (c) the classification used by the Laboratory of Urban Research for the series of volumes *Research on Urban Standards* [26]; (d) the classification used by the Ministry of Regional Planning, the Settlement and the Environment for Operation *Urban Reconstruction* [27]; (e) the classification of urban and land uses of the Presidential Decree *Categories and Content of Land Uses*

published in the Greek Government Gazette [28]; and (f) the classification used in the construction of the National Cadastre [29].

There is also a large international bibliography on use typologies. Of special interest to us were the use typologies found in planning systems that include planning standards, such as in Italy, in Germany and in Hong Kong, as the use of standards presupposes a classification of urban uses [30–32]. Even systems that are not obviously use typologies are directly related to them. The American concept of zoning, the main tool of land use planning, although not a use typology is based on uses [33].

The British classification system deserves comment, given the long tradition of urban planning in the UK and because it is one of the most developed systems of use categories, which is frequently updated. Cullingworth and Nadin discuss the way use categories are applied in development control [34] (pp. 152–154). It is particularly relevant for commercial property transactions, that is, it mainly depends on a non-analytical perspective. The basis of this classification system is the Town and Country Planning (Use Classes) Order, of which we shall use as an example the older Order of 1987 [35,36]. This legislation consists at first view of three hierarchical levels: groupings of classes, classes and their uses. Group A includes five classes, group B eight classes, group C four (or five) classes, group D two classes, and there is also a “*sui generis*” class, including what the regulators felt was left out.

However, this does not appear to be the case on closer inspection:

- (a) The groupings are heterogeneous and do not cover any recognisable use category. For example, Class A1 of grouping A includes “Shops”, while Class A2 “Financial and professional services”; Class B1 includes some kinds of offices, while Classes B2 to B8 refer to different kinds of industry; Class C revolves around accommodations (hotels and boarding houses, as well as residence) but with Class C2 it also includes “residential” uses such as schools, hospitals and prisons; Class D includes “non-residential” uses, from health services to museums; in the *sui generis* class theatres are included, while cinemas are classified in Class D2.
- (b) The contents of the classes do not belong to the same level. For example, Class A1 includes “Shops” in general, but also the specific unitary types of post offices and florists; Class B1 includes offices, while Class C2 includes schools, hospitals and prisons, which are unitary types, Class D1 museums and public libraries, also unitary types, and Class D2 cinemas and dance halls, still unitary types.

On the whole, this Order contains about 20 classes, of which about one-third (6) concern industry. A great number of uses are missing: a systematic classification should cover every possible type and not only “examples” of types, as happens with Class B5. In addition to the lack of a rigorous rationale, the classification is confusing because it is based on spontaneous, unspecified criteria, mixing two different perspectives: a typological perspective concerning *logical* relations between uses and a spatial one based on the *location* of uses. There is no room here to discuss this issue adequately, but it is not possible to establish a typology of uses starting from their locational manifestations, which only give a statistical indication but cannot lead to a structured result. Quite the opposite, the location of uses in a spatial zone is a combination of logical categories of uses responding to the nature of the zone.

It should by now be evident why we feel planning needs a systematic classification of urban uses. In addition to its evident value in analysis and its usefulness for applied planning proposals, its most important contribution might be to give us a common, agreed-on terminology and thus facilitate communication and understanding, not to mention clearly formulated legislation and regulation.

Below, we present the 21 urban categories and the decisions which led to their division into more analytical functional sets (see Table A1, available also in .xls format in Supplementary Materials):

- I. *Agriculture.*
- II. *Animal production.*
- III. *Forestry and logging.*
- IV. *Fishing and aquaculture.*

V. *Mining and quarrying.*

The above five urban categories are not further analysed into specialised functional sets, since they are of very limited interest to urban planning.

VI. *Manufacturing.* Manufacturing is divided into small industry and industry on the basis of the number of employees of the firm, since the number of occupants and the surface area are the two basic units of measurement of urban uses. These units are the ones strictly corresponding to a functional approach (the final aim of “spatial” planning), without having recourse to other fields. However, when judged necessary, non-urbanological criteria may be used, such as the invested capital or turnover of an enterprise. Manufacturing units that employ fewer workers than a certain threshold, which should be determined in each case on the basis of the statistical distribution of the sizes of firms, are classified as small industry, while manufacturing units with more workers are classified as industry. A threshold of 50 employees is a satisfactory demarcation line on the scale from small industry manufacture to industrial manufacture, at least given the magnitudes in the Greek manufacturing sector (the statistical service of Greece divides our sub-category of small industry into a total of four groups, covering from 1 to 49 employees). Each of these two sub-categories can be further subdivided into sixteen sets of uses, located on the level of sub-groups. This division, which follows the criterion of the type of product being manufactured, leads to the definition of the sub-groups which appear in Table A1.

VII. *Utilities.* This category includes the nodes of the infrastructural networks (mains of natural gas and liquid fuels, electricity lines, water and sewerage), as well as bus and lorry terminals, railway stations, airports, seaports and telecommunications centres.

VIII. *Transportation.* The category of transportation is analysed on the basis of the nature of the use into the sub-category of transport services on the one hand, and parking areas for vehicles and boats on the other. The first sub-category is further divided, on the basis on the nature of the service offered, into the sub-group of passenger transport and freight.

IX. *Wholesale trade and warehousing.* Wholesale trade and warehousing are different types of use and from that point of view should constitute different urban categories. However, the distinction is often not very clear-cut and for that reason we have chosen to combine them in a single urban category. Warehousing is mainly a secondary activity functioning in support of some other, primary activity, as for example, on an architectural scale, safe-deposit boxes providing storage space is a secondary function of a bank and storage space in housing units is a secondary function of housing. In such cases, the proportion of the floor area occupied by the function of storage is a small part of the whole and does not change the character of the use. In the majority of cases, warehousing is either a part of the activity of wholesale trade and thus classified as such, or part of a transport node (seaport, airport or terminal), in which case it is a part of a complex use and follows the classification of the latter. As a result, there are very few spaces used for warehousing in urban areas which are not part of wholesale trade or of some complex activity. When warehousing occurs as a spatially independent use, such spaces constitute the sub-category of warehousing, as distinct from the sub-category of wholesale trade, which among other things includes all storage spaces used specifically for the activity of wholesale trade.

X. *Retail trade.* Retail trade, as we know, is the activity of selling products directly to the consumer. On the basis of the nature of the use taking place, it can be analysed into two sub-categories: general retail trade and trade in services; the latter retains the characteristic of being addressed directly to the consumer, but as a consumer of services [37] (p. 11). General retail trade is divided, on the basis of the frequency of access of its customers, into four groups: daily retail trade, occasional retail trade, infrequent retail trade and retail trade without the physical presence of the customer. The first three groups can be further divided into subgroups on the basis of the type of product being sold, as seen in Table A1. The sub-category of trade in services, in its turn, can be further analysed on the basis of the service provided into the group of general trade in services and the group of repairs. Differentiation on the basis of the type of service provided leads to the further division of the first group into the

sub-group of general trade in services and that of the activity of leasing, while the second group divides into repair of personal and household goods, repair of vehicles and repair of machines and equipment.

XI. *Recreation*. The urban category of recreation is divided into two sub-categories: hotels and campings on the one hand, and specialised recreational services on the other. This distinction is based on the different nature of the uses in the sub-categories: hotels and campings are complex uses which may include as many as all of the separate uses in the sub-category of specialised recreational uses. In the case of the specialised recreational uses, since empirically no groups appear on the next hierarchical level, we proceed directly to three sub-groups according to the type of recreational service provided: recreational activities centred on food and beverages, recreational activities associated with coffee shops and bars, and other recreational activities.

XII. *Offices*. The urban category of office services can be analysed into two groups on the basis of the nature of the use. The first group, general offices, includes services offered by the private or public sector in which service providers and consumers exchange oral information and/or written documents [38] (p. 1). On the basis of the services provided, this group is further divided into five sub-groups (see Table A1). The second group, that of ancillary offices, includes all offices functioning as support for a primary use which takes place outside the office space and because of its nature cannot be located spatially in a particular place. This is the case, for example, with offices maintained by technicians (such as plumbers or electricians).

XIII. *Education*. The urban category of education can be analysed on the basis of the service provided into four sub-groups: primary education, secondary education, tertiary education and other educational activities. The first three sub-groups can also be defined in terms of the radius of the area they serve, since they correspond to the neighbourhood, wider local, and urban/regional level.

XIV. *Research activities*. This category includes research centres, laboratories and institutes of basic, applied and experimental research which are found as spatially independent uses, in other words not as part of another primary use such as universities. They are not further divided into specialised functional sets.

XV. *Culture*. The urban category of culture can be divided, on the basis of the nature of the use, into the sub-group of general cultural uses and the sub-group of religious uses.

XVI. *Health*. This category includes all activities related to human health. There is no further analysis into specialised functional sets.

XVII. *Social services*. The division of the urban category of social services follows the classification of NACE, which differentiates these uses into two sets, depending on the type of service provided, in particular whether it includes accommodations for the client. The provision of accommodation alters the nature of the social services and leads to their classification into the subgroups of social services which provide accommodation and those which do not.

XVIII. *Order, safety and defense activities*. This category includes all uses connected with public order, security and defence, such as police and firefighting forces, courts, prisons and military bases. There is no further analysis into specialised functional sets.

XIX. *Sports*. This category, which is not further analysed into specialised functional sets, includes all installations used for athletic activities. We note that the unitary types of this category which appear in urban space as installations differ significantly in terms of their size on the one hand, and on the other hand in terms of the complexity of both their athletic and their general functional composition, two dimensions which do not necessarily go hand in hand. We also find combinations of athletic uses in installations with progressively greater levels of complexity and size, as are those proposed by Operation Urban Reconstruction for the planning of urban athletic spaces [27].

XX. *Housing*. The urban category of housing includes those uses in which the primary activity is the provision of long-term accommodation. On the basis of the nature of the use, it is analysed into two sub-categories, of which the first is housing (including private and public or workers' housing as well as corporate housing), while the second sub-category includes every other activity focused on the

provision of accommodations, such as school dormitories, student residences, serviced apartments and condominium hotels.

XXI. *Open and green spaces*. This category includes all open spaces which are meant for strolling or public gatherings, or are designed for viewing and aesthetic pleasure, independently of their morphological characteristics or the urban furniture they may contain. It is not further analysed into specialised functional sets.

In the above classification of uses it is obvious that differences in the nature of the uses is the only criterion employed for the determination of the urban categories, and the primary criterion used to determine the urban sub-categories, applied in all the cases with the exception of the distinction between small industry and industry, which was based on the size of the firm. For the determination of the urban groups, three criteria were used equally: the nature of the use, the frequency of access and the type of product or service offered; the latter criterion was the only one employed in the determination of the sub-groups. This confirms the order of importance of the four criteria set out above for the definition of urban uses: the nature of the use is the most crucial criterion, with the second being the type of product or service offered.

As we mentioned in the introduction to this paper, classification has one characteristic which differentiates it from all other processes of creating groups, namely the fact that it is constructed to serve a particular purpose. This purpose determines the more analytical classification criteria used for the formation of groups, and each classification is judged, in the final analysis, on how well it serves this specified purpose. In the classification above, we have avoided any reference to specific operational goals, since we have tried to avoid any idiosyncratic reasoning and set out a classification of urban uses both based on a sound theoretical foundation and offering a general guide for any urban planning application. Indeed, our proposal is very closely connected to applied planning (as indicated by the planning studies cited above) and to related principles of classification (such as NACE).

There are cases where it is useful or necessary to modify the classification chosen. Such modifications may be of a purely planning nature, or due to external considerations. Taking the planning modifications first, it may be necessary to condense the urban categories into a number of classes that is more manageable for cartographical purposes (and statistically simplified). The usual needs and constraints of the cartographical representation of urban space limit the presentation to no more than 10 separate thematic objects, which leads to a condensation of the 21 urban categories into less than half that number. In this case one could consider grouping the categories of the classification into even larger sets (super-categories). Indeed, the first five categories (from agriculture to mining and quarrying) can for the purposes of planning be combined into the super-category of non-urban uses, or from the point of view of economics into that of the primary sector (see Table A2, available also in .xls format in Supplementary Materials). The urban categories of transportation and utilities can be combined with wholesale trade, since most of the latter consists of warehouses, which are directly related to the uses of transportation. Retail trade can be grouped with the urban category of recreation, since the latter is closely related to the trade in services, which is a sub-category of retail trade. Finally, the categories of education, research and culture combine into the super-category of culture, and in the same way the categories of health and social services make up the super-category of social services. These modifications reduce by 10 the number of groups at the highest level of the classification.

In the case of modification due to external constraints, some non-urbanological criteria are introduced and combined with the urban matrix to produce an empirically useful mixed classification. A criterion which usually is of interest to a planning study is legal in nature and concerns the ownership status of a particular use, which leads to a division of uses into private and public. The distinction between private and public uses is very useful during the planning phase and for that reason it needs to be kept in mind already during the phases of surveying and analysis of urban space. The introduction of this criterion modifies the categories of office services, dividing it into the two sub-categories of public administration and private offices offering services; a similar distinction needs to be applied in the categories of education and health, establishing separate sub-categories of public and private

uses. Finally, the application of the same criterion in the case of sports leads to the renaming of the category as public sports installations and the removal of all private schools of martial arts, fitness facilities and schools of alternative gymnastics, which are re-classified in the sub-group of general trade in services. In addition to the legal criterion of ownership status, the ecological criterion of the nuisance level of a manufacturing unit is also frequently employed in planning. The use of this criterion is particularly important in determining the location of manufacturing in relation to housing. The customary classification of manufacturing units when this criterion is applied is to divide them into polluting and non-polluting units, as seen in Table A2; a widening of the scale with the addition of intermediate levels of pollution is also common. The combination of this classificatory approach with additional criteria (size of industrial installation, type of manufactured product, type of raw materials, amount of energy consumed) lead to the empirical division of manufacturing into light and heavy industry. This is an alternative classification to the one presented in Table A2.

5. Conclusions

In Section 4, we made it clear that we understand urban categories as a function of socio-economic practices. In fact, these categories are the products of society and history. They are social and not individual products, and certainly not the invention of the planner's imagination. Due to their character, they are not an amorphous constellation of uses, but a structured whole, produced by a structured society. For the same reason, they do not remain stable in time, but change together with social changes, as also the consecutive adaptations of the British use classes order show. However, in each historical phase they do show a relative stability. Thus, proposing a theoretical classification in a specific time, and for a specific social context, such as Europe, or the West in general, or of even greater scope due to globalisation, is not an abstract exercise, but a valuable operational tool. When changes occur, they are never sea-changes, and each time minor, rarely more important adjustments are needed to the previous classification. Any classification is open to the future.

Every urban planning study, whether it concerns an analysis or a planning proposal, includes as a definitive stage the classification of urban uses. The analytical phase includes the survey and mapping of uses, for which the classification of uses into larger or smaller sets is a fundamental step in filtering the complexity of urban space and revealing its basic functional structure. The planning phase concludes with the official land use plan, that is, with the specification and/or proposal of particular sets of uses which may be located on particular sections of ground. Thus, this operation too is based on the same uses that were taken into account during analysis. We should also not forget urban legislation, which mediates between analysis and planning. No plan can escape legal prescriptions and, from this point of view, even a very well thought-out and "original" plan is not truly original. If the prescriptions are problematic, so will the plan be. However, although the classification of urban uses constitutes the foundation of any urban planning study, in all the three instances of analysis, legislation and proposals, this field of research has remained insufficiently theorised, something we believe is directly related to the lack of a theory of urban uses.

There is in the tradition of Anglo-Saxon human geography an idiosyncratic view, recently revived in these postmodern times on a more general level including urban planning, according to which each case is unique and no general rules can be established. There is no space here to address this argument theoretically; we shall simply point out that the existence of urban legislation covering wide geographical areas gives an answer in practice. Also, opting for "small narratives" is not the same thing as a rejection of all (socio-)logical operations, and Sections 3 and 4 above address this inescapable issue.

A tight classification such as the one proposed here may give the impression of inflexibility. This is not our aim. We understand it as a valuable background, actually much richer than any specific case of planning, which may guide planners by offering them the full range of uses on different levels of generality and thus the possibility of not starting every time from zero. Such a system does not

preclude adjustments to local conditions and traditions, through division or unification of categories, or further subdivisions even of unitary types.

We hope that the above discussion supports our view that urban and regional planning should be founded on a theoretical urbanology and regionology, and should start from the major issue of the classification of uses. We also hope we have shown that the latter is not just an intellectual pastime, but addresses the very core of land use planning practice. We do not pretend that our answer to this issue is a final solution. But at least it represents a first step and offers a basis for agreement or disagreement, that is, discussion.

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Appendix A

Table A1. Classification of the unitary types of urban uses into categories, sub-categories, groups and sub-groups (columns 1, 2, 3 and 4 respectively), on the basis of purely urbanological criteria. Columns 5 and 6 give our numbering and description of each type of use, and Column 7 the code numbers of the unitary types of urban planning according to NACE Rev.2.

CLASSES OF URBAN USES						
CATEGORIES	SUB-CATEGORIES	Groups	Sub-groups	Numbering	Unitary Types of Land Use	NACE Rev.2 Codes
I. AGRICULTURE						
				1	Cultivation of cereals, rice, leguminous crops, oil seeds and other non-perennial crops in open fields	1.11, 1.12, 1.14–1.19
				2	Cultivation of vegetables, roots, tubers in open fields	1.13
				3	Cultivation of non-perennial crops in greenhouses	1.13
				4	Cultivation of perennial crops in open fields	1.2
				5	Plant nurseries	1.3
II. ANIMAL PRODUCTION						
				6	Animal husbandry	1.41–1.46, 1.49
				7	Poultry farming	1.47, 1.49
				8	Apiculture and production of honey and beeswax	1.49
				9	Sericulture and raising of other insects	1.49
				10	Slaughterhouses	10.1
III. FORESTRY AND LOGGING						
				11	Forestry and logging in planted forest	2.1, 2.2
IV. FISHING AND AQUACULTURE						
				12	Fishing wharf	no code
				13	Aquaculture facilities	3.2
V. MINING AND QUARRYING						
				14	Mining of solid, liquid or gas minerals	5.1, 5.2, 6.1, 6.2, 7.1, 7.2
				15	Quarrying	8.1, 8.91, 8.92, 8.93, 8.99
				16	Salt production by evaporation of sea water or other saline waters	8.93
VI. MANUFACTURING						
SMALL INDUSTRY (less than 50 employees)						
				Production and transmission of energy		
				17	Production and transmission of electricity	35.11, 35.12
				18	Production of natural gas	35.21
				19	Production and distribution of steam and hot water	35.3
				Production of raw materials		
				20	Manufacture of coke and refined petroleum products	19
				21	Manufacture of wood and wooden raw materials	16.1, 16.21, 16.24

Table A1. Cont.

CLASSES OF URBAN USES						
CATEGORIES	SUB-CATEGORIES	Groups	Sub-groups	Numbering	Unitary Types of Land Use	NACE Rev.2 Codes
(1)	(2)	(3)	(4)	(5)	(6)	(7)
				22	Manufacture of paper	17.11, 17.12
				23	Manufacture of basic metals	24
				24	Manufacture of basic chemicals and plastics in primary form	20.1
					Production of structural raw materials and construction products	
				25	Manufacture of non-metallic structural raw materials	23.2, 23.5, 23.6, 23.7, 23.99
				26	Manufacture of wooden structural raw materials	16.22, 16.23
				27	Manufacture of non-metallic building and construction products	23.11, 23.12, 23.14, 23.3, 23.41–23.43
				28	Manufacture of structural metal products	25.1
				29	Manufacture of furniture	31.01, 31.02, 31.09
					Manufacture of wooden and paper products	
				30	Manufacture of wooden products	16.29
				31	Manufacture of paper products	17.2
					Manufacture of rubber and plastic products	
				32	Manufacture of rubber and plastic products	22
					Manufacture of glass and ceramic products	
				33	Manufacture of glass and ceramic products	23.13, 23.19, 23.44, 23.49, 23.91
					Manufacture of metal products	
				34	Manufacture of fabricated metal products other than machinery and equipment	25.2, 25.3, 25.5–25.9
				35	Manufacture of machinery and equipment	28
				36	Manufacture of weapons and ammunition	25.4
					Manufacture of textile and leather products	
				37	Manufacture of textiles	13.1, 13.2, 13.3, 13.91, 13.92, 13.94–13.99
				38	Manufacture of carpets and rugs	13.93
				39	Tanning and dressing of leather; dressing and dyeing of fur	15.11
				40	Manufacture of leather and fur apparel	14.11, 14.2, 15.12, 15.20
				41	Manufacture of apparel other than fur and leather apparel	14.12–14.19, 14.3
					Manufacture of food products, beverages and tobacco products	
				42	Production of olive oil	10.41
				43	Flour mill	10.61
				44	Production and distilling of grape must	11.02
				45	Manufacture of food products, beverages and tobacco products	10, 11, 12
					Manufacture of chemical and pharmaceutical products	
				46	Manufacture of chemicals and chemical products	20.2, 20.3, 20.5, 20.6
				47	Manufacture of basic pharmaceutical and cosmetic chemical products	20.4, 21
					Manufacture of vehicles and transport equipment	
				48	Manufacture of bicycles and invalid carriages	30.92, 30.99
				49	Manufacture of motorcycles, motor vehicles, trailers and semi-trailers	29, 30.91
				50	Manufacture of railway locomotives and rolling stock	30.2
				51	Building of ships and boats	30.1
				52	Manufacture of aircraft, spacecraft and related machinery	30.3
				53	Repair of ships, boats, aircraft, spacecraft, locomotives and other transport equipment	33.15–33.17
				54	Manufacture of military fighting vehicles	30.4
					Manufacture of electrical and electronic products	
				55	Manufacture of electrical products	27
				56	Manufacture of computer and electronic products	26.1–26.4, 26.51, 26.6, 26.7
					Manufacture of optical and magnetic products	
				57	Manufacture of optical instruments and photographic equipment	26.7
				58	Manufacture of magnetic and optical media	26.8
					Manufacture related to printing, reproduction and publishing	
				59	Printing and service activities related to printing	18.1
				60	Reproduction of recorded media	18.2
					Manufacture of personal and household goods	
				61	Manufacture of mattresses	31.03
				62	Manufacture of jewellery, bijouterie and related articles	32.1
				63	Manufacture of watches and clocks	26.52
				64	Manufacture of musical instruments	32.2
				65	Manufacture of games and toys	32.4
				66	Manufacture of medical and dental instruments and supplies	32.5
				67	Manufacture of sports goods	32.3
					Materials recovery and other manufacturing	
				68	Materials recovery	38.3
				69	Manufacturing n.e.c.	32.9, 82.92

Table A1. Cont.

CLASSES OF URBAN USES						
CATEGORIES	SUB-CATEGORIES	Groups	Sub-groups	Numbering	Unitary Types of Land Use	NACE Rev.2 Codes
(1)	(2)	(3)	(4)	(5)	(6)	(7)
INDUSTRY (50 or more employees) (Sub-groups as in the sub-category of Small Industry)						
VII. UTILITIES						
				70	Infrastructure related to distribution of fuels and other products through mains	35.22, 49.52
				71	Infrastructure related to distribution of electricity	35.13
				72	Infrastructure related to water collection, treatment and supply	36
				73	Infrastructure related to waste treatment and disposal	38.2
				74	Infrastructure related to television, radio and data broadcasting and other telecommunications activities	60, 61
				75	Railroad infrastructure, other than terminal facilities	52.21
				76	Water transport infrastructure, other than terminal facilities	52.22
				77	Air transport infrastructure, other than terminal facilities	52.23
				78	Public toilets	no code
VIII. TRANSPORTATION						
TRANSPORTATION						
				Passenger transport		
				79	Railway passenger terminal facilities	52.21
				80	Port passenger terminal facilities	52.22
				81	Air transport passenger terminal facilities	52.23
				82	Bus passenger terminal facilities	52.21
				83	Passenger terminal facilities of other land transport	49.39
				84	Taxi operation facilities	49.32
				Freight transport		
				85	Road freight terminal facilities	52.21
				86	Rail freight terminal facilities	52.21
				87	Port freight terminal facilities	52.22
				88	Air freight terminal facilities	52.23
				89	Custom houses	no code
				90	Postal and courier activities	53
				PARKING FACILITIES		
				91	Car parking facilities	52.21
				92	Marinas	93.29
IX. WHOLESALE TRADE AND WAREHOUSING						
WHOLESALE TRADE						
				93	Wholesale of agricultural raw materials and live animals	46.2
				94	Wholesale of food, beverages and tobacco	46.3
				95	Wholesale of personal and household goods	46.41, 46.42, 46.44–46.49
				96	Wholesale of electrical, electronic and communication products	46.43, 46.5
				97	Wholesale of machinery	46.6
				98	Other wholesale	45.31, 46.7, 46.9
				WAREHOUSING		
				99	Warehousing and storage	52.1
X. RETAIL TRADE						
GENERAL RETAIL TRADE						
				Daily retail trade		
				Retail trade in food and beverages		
				100	Grocery shop: Retail sale in small non-specialised stores with food, beverages or tobacco predominating	47.11
				101	Supermarket: Retail sale in large non-specialised stores with food, beverages or tobacco predominating	47.11
				102	Greengrocery: Retail sale of fruit and vegetables in specialised stores	47.21
				103	Butcher's shop: Retail sale of meat and meat products in special stores	47.22
				104	Fish shop: Retail sale of fish, crustaceans and molluscs in special stores	47.23
				105	Bakery: Retail sale mainly of bread, but also of cakes, flour confectionery and sugar confectionery in specialised stores	47.24
				106	Patisserie: Retail sale of cakes, flour confectionery and sugar confectionery in specialised stores	47.24
				107	Liquor store: Retail sale of alcoholic beverages in specialised stores	47.25
				108	Coffee roastery: Retail sale of coffee and dried fruits in specialised stores	no code
				109	Tobacco shop: Retail sale of tobacco products in specialised stores	47.26

Table A1. Cont.

CLASSES OF URBAN USES						
CATEGORIES	SUB-CATEGORIES	Groups	Sub-groups	Numbering	Unitary Types of Land Use	NACE Rev.2 Codes
(1)	(2)	(3)	(4)	(5)	(6)	(7)
				110	Retail sale of dairy products and other food products in specialised stores	47.29
				111	Retail sale of organic food products in specialised stores	no code
				Other daily retail trade		
				112	Retail sale of cosmetic and toilet articles in specialised stores	47.75
				113	Pharmacy	47.73
				114	Stationery shop: Retail sale of stationery in specialised stores	47.62
				115	Petrol station: Retail sale of automotive fuel in specialised stores	47.3
				Occasional retail trade		
				Retail trade in clothing and footwear		
				116	Retail sale of clothing in specialised stores	47.71
				117	Retail sale of footwear in specialised stores	47.72
				118	Retail sale of leather clothing, footwear and other leather goods in specialised stores	47.72
				119	Retail sale of sporting equipment in specialised stores	47.64
				Occasional retail trade in personal goods		
				120	Retail sale of optical goods and activities of opticians	47.78
				121	Bookstore: Retail sale of books in specialised stores	47.61
				122	Retail sale of music and video recordings in specialised stores	47.63
				123	Retail sale of computers, peripheral units and software in special stores	47.41
				124	Retail sale of telecommunications equipment and services in special stores	47.42, 61.90
				Other occasional retail trade		
				125	Retail sale in department stores of apparel, furniture, appliances, hardware, cosmetics, etc.	47.19
				126	Toy store: Retail sale of games and toys in specialised stores	47.65
				127	Retail sale of furniture, lighting equipment and other household articles in specialised stores	47.59
				128	Florist: Retail sale of flowers, plants, seeds and fertilisers in special stores	47.76
				129	Locksmith: Retail sale of padlocks, locks, keys, hinges and the like; provision of key duplication services	95.29
				130	Retail sale of electrical wiring and fittings and other electrical equipment	no code
				131	Retail sale of plumbing and heating equipment	no code
				132	Retail sale of hardware and paints in specialised stores	47.52
				133	Retail sale of flat glass	47.52
				134	Retail sale of building materials	47.52
				135	Second-hand store: Retail sale of second-hand clothing, books and other second-hand goods	47.78
				136	Farmer's market: Retail sale via stalls and markets	47.8
				Infrequent retail trade		
				Infrequent retail trade in personal goods		
				137	Jewellery store: Retail sale of watches and jewellery in specialised stores	47.77
				138	Retail sale of medical and orthopedic goods in specialised stores	47.74
				139	Retail sale of travel and camping equipment and accessories	47.72, 47.64
				140	Retail sale of scale models, arts and crafts equipment and materials	no code
				141	Sex shop: Retail sale of sex products	no code
				142	Photographer's shop: Retail sale of photographic, optical and precision equipment	47.78
				143	Retail sale and repair of bicycles	47.74, 95.29
				Retail trade in household goods		
				144	Retail sale of sanitary fixtures, tiles and other ceramic products	47.52
				145	Retail sale of carpets, rugs, wall and floor coverings in specialised stores	47.53
				146	Retail sale of electrical household appliances in specialised stores	47.43, 47.54
				Retail trade in motor vehicles and motorcycles		
				147	Sale of motor vehicles	45.1
				148	Retail sale of motor vehicle parts and accessories	45.32
				149	Sale of motorcycles and related parts and accessories	45.4
				150	Retail sale of second-hand motor vehicles and motorcycles	47.79
				Other infrequent retail trade		
				151	Retail sale and repair of musical instruments	47.59, 33.19, 95.29
				152	Retail sale of marine and fishing gear	47.72, 47.64
				153	Retail sale of weapons and ammunition	47.78
				154	Retail sale of textiles in specialised stores	47.51
				155	Pet shop: Retail sale of pet animals and pet food in specialised stores	47.76

Table A1. Cont.

CLASSES OF URBAN USES						
CATEGORIES	SUB-CATEGORIES	Groups	Sub-groups	Numbering	Unitary Types of Land Use	NACE Rev.2 Codes
(1)	(2)	(3)	(4)	(5)	(6)	(7)
				156	Retail sale of souvenirs, handicrafts and religious articles	47.78
				157	Art gallery: Retail sale of art and activities of commercial art galleries	47.78
				158	Antique shop: Retail sale of antiques	47.79
				159	Auction house: Retail trade performed in auction houses	47.79
				160	Other retail sale of new goods in specialised stores	47.78
					Retail trade without the physical presence of the customer	
				161	Retail sale through mail order houses or the Internet	47.91
					RETAIL TRADE IN SERVICES	
					Retail trade in services	
					General trade in services	
				162	Services related to the provision of electricity and natural gas through mains	35.14, 35.23
				163	Hairdressers	96.02
				164	Beauty salons and massage parlours	96.04
				165	Tattooing and piercing studios	96.09
				166	Brothels and escort services	no code
				167	Services of astrologers and spiritualists	96.09
				168	Veterinary and pet care services	96.09
				169	Photographic services	74.2
				170	Photocopying, document preparation and other specialised office support services	82.19
				171	Washing and dry-cleaning services	96.01
				172	Car washing and polishing services	45.20
				173	Performance testing of motors and automobiles	71.20
				174	Laboratories for technical testing and analysis	71.20
					Leasing	
				175	Renting and leasing of motor vehicles, air and water transport equipment	50.10, 50.30, 77.1, 77.34, 77.35
				176	Renting and leasing of personal and household goods	77.20
				177	Renting and leasing of machinery, equipment and other tangible goods	77.31–77.33, 77.35, 77.39
					Repairs	
					Repair of personal and household goods	
				178	Shoemaker's workshop: Repair of footwear and leather goods	95.23
				179	Tailor/seamstress: Repair and alteration of clothing	95.29
				180	Repair of computers and peripheral equipment	95.11
				181	Repair of communications equipment	95.12
				182	Repair of consumer electronics and household appliances	95.21, 95.22
				183	Repair of watches, clocks and jewellery	95.25
					Repair of motor vehicles and motorcycles	
				184	Mechanical maintenance and repair of motor vehicles	45.2
				185	Electrical maintenance and repair of motor vehicles	45.2
				186	Bodywork maintenance and repair of motor vehicles	45.2
				187	Repair and replacement of seats of motor vehicles	45.2
				188	Repair and replacement of screens and windows of motor vehicles	45.2
				189	Sales, repair, fitting and replacement of exhaust pipes of motor vehicles	45.2
				190	Sales, repair, fitting and replacement of tyres and tubes of motor vehicles	45.2
				191	Maintenance and repair of motorcycles	45.4
					Repair of machinery and equipment	
				192	Repair of machinery and metal products	33.11, 33.12
				193	Repair of electrical equipment	33.14
				194	Repair of electronic and optical equipment	33.13
				195	Repair of other equipment	33.19, 95.24
					XI. RECREATION	
					HOTELS, CAMPINGS AND SIMILAR ACCOMMODATIONS	
				196	Hotels providing accommodations, including motels and hostels	55.1, 55.2
				197	Hotels providing accommodations and recreation	55.1, 55.2
				198	Camping grounds, recreational vehicle parks and trailer parks	55.3
				199	Mountain refuges	55.2
				200	Beaches	93.29
					SPECIALISED RECREATIONAL SERVICES	
					Recreational food and beverages services	

Table A1. Cont.

CLASSES OF URBAN USES						
CATEGORIES	SUB-CATEGORIES	Groups	Sub-groups	Numbering	Unitary Types of Land Use	NACE Rev.2 Codes
(1)	(2)	(3)	(4)	(5)	(6)	(7)
				201	Cocktail lounges, beer parlours, cafeterias, coffee shops and juice bars: Preparation and serving of beverages for immediate consumption on the premises	56.3
				202	Restaurants, taverns, pizza parlours, snack bars: Provision of food services to seated customers	56.1
				203	Patisseries, pastry shops and donut shops: Provision of confectioneries to seated customers	no code
				204	Canteens, fast-food and take-out restaurants: Provision of food and beverages to non-seated customers	56.1
					Recreational services that also provide food and beverages	
				205	Dance halls, bars, clubs, clubs with live music and discotheques: Night entertainment with the provision of food and beverages to seated customers	56.3
				206	Fun parks for children	no code
				207	Coin-operated games	93.29
				208	Bowling lanes	93.11
					Other specialised recreational services	
				209	Cinemas: Motion picture projection activities	59.14
				210	Gambling and betting shops	92
				211	Casinos	92
				212	Turkish baths, saunas and steam baths	96.04
				213	Amusement parks	93.29
XII. OFFICES						
					General offices	
					Offices of public administration and offices of unions, organisations, clubs and associations	
				214	Public administration	84.1
				215	Social security organisations	84.3
				216	Local administration offices	no code
				217	Embassies and consulates	84.21, 99.00
				218	Head offices of companies	70.1
				219	Offices of international organisations	99
				220	Chambers of Commerce, employers' organisations, professional associations and trade unions	94.11–94.13
				221	Offices of political organisations	94.92
				222	Offices of sport clubs	93.12
				223	Offices of non-government organisations, associations and movements	94.99
					Offices of financial services and insurance	
				224	Banks and credit unions	64.1
				225	Currency exchanges	
				226	Offices of financial leasing	64.91
				227	Pawnbrokers	64.92
				228	Stock exchanges	66.11
				229	Stockbrokerages	66.12
				230	Activities of holding companies	64.2
				231	Trust funds and similar financial entities	64.3, 66.19, 66.3
				232	Other financial services	64.99
				233	Private insurance, reinsurance and pension fund offices	65, 66.2
					Offices of professional services	
				234	Management consultancy offices	70.2
				235	Accounting, bookkeeping and auditing offices	69.2
				236	Legal offices	69.1
				237	Architectural and engineering offices	71.1
				238	Graphic, industrial and fashion design and interior decoration studios	74.1
				239	Advertising offices	73.1
				240	Real estate and real estate appraisal offices and other offices of commission agents	68, 46.1
					Offices related to publishing, telecommunications and media industries	
				241	Publishing of books, periodicals and other publishing activities	58
				242	Wire-based, wireless, satellite and internet-based telecommunications services	61, 63.99
				243	Radio stations	60.1
				244	Television programming and broadcasting companies	60.2
				245	Offices of web portals	63.12
				246	News agencies	63.91
				247	Motion picture, video and television programme production and post-production services	59.11, 59.12

Table A1. Cont.

CLASSES OF URBAN USES						
CATEGORIES	SUB-CATEGORIES	Groups	Sub-groups	Numbering	Unitary Types of Land Use	NACE Rev.2 Codes
(1)	(2)	(3)	(4)	(5)	(6)	(7)
				248	Motion picture, video and television programme distribution services	59.13
				249	Sound recording and music publishing services	59.2
			Personal services	250	Psychological, marriage and family counselling and credit and debt counselling services	88.99
				251	Computer programming, consultancy, data processing, hosting and related activities	62.01, 62.02, 62.09, 63.11
				252	Translation and interpretation activities	74.3
				253	Employment and human resources services	78
				254	Dating services	96.09
				255	Market research and public opinion polling	73.2
				256	Private investigators	80.3
				257	Office and secretarial support services	82.19
				258	Call centres	82.2
				259	Billing and record-keeping services for complexes and multistorey buildings	82.11
				260	Organisation of conventions and trade shows services	82.3
				261	Travel agencies, tour operators and other related offices	79
				262	Funeral and related services	96.03
				263	Collection agencies and credit bureaus	82.91
			Ancillary offices	264	Other personal services	74.9, 90.02–90.04, 93.19
				265	Catering and other food service activities	56.2
				266	Security services	80.1, 80.2
				267	Maintenance, cleaning and disinfecting services for buildings and gardens	81
				268	Operation of sewage systems, waste collection, remediation activities and other waste management services	37, 38.1, 39
				269	Freight transport services	49.41, 50.20, 50.40, 59.29
				270	Removal services	49.42
				271	Construction activities	41, 42, 43
EDUCATION						
			Primary education	272	Kindergardens	85.1
				273	Elementary schools	85.2
			Secondary education	274	Lower secondary schools and special lower secondary schools	85.31
				275	Upper secondary schools and technical, vocational and other special upper secondary schools	85.32, 85.33
			Post-secondary and tertiary education	276	Post-secondary non-tertiary technical and vocational institutes and colleges	85.41
				277	Technological educational institutes	85.42
				278	Universities	85.42
			Other educational activities	279	Learning centres, foreign language centres, computer skills and other private educational institutions	85.59, 85.6
				280	Music, dance, drama, photography and other fine arts schools	85.52
				281	Driving, flying, sailing and shipping schools	85.32, 85.53
XIV. RESEARCH ACTIVITIES						
				282	Research centres, research laboratories and research institutes	72
XV. CULTURAL ACTIVITIES						
			General cultural activities	283	Concert halls, theatres and other arts facilities	90.01
				284	Libraries and archives	91.01
				285	Museums and galleries	91.02
				286	Conference centres	no code
				287	Exhibition halls, showrooms and trade shows	no code
				288	Archeological sites, historical sites and buildings and similar visitor attractions	91.03
			Religious activities	289	Churches, mosques, temples, synagogues and other places of worship	94.91
				290	Burial activities	94.91

Table A1. Cont.

CLASSES OF URBAN USES						
CATEGORIES	SUB-CATEGORIES	Groups	Sub-groups	Numbering	Unitary Types of Land Use	NACE Rev.2 Codes
(1)	(2)	(3)	(4)	(5)	(6)	(7)
				291	Cemeteries and memorial parks	no code
XVI. HEALTH						
				292	General and specialised hospitals and clinics	86.1
				293	Blood banks, sperm banks and transplant organ banks	86.9
				294	Medical, paramedical and dental practices	86.2, 86.9
				295	Blood analysis, X-rays and other diagnostic laboratories	86.9
XVII. SOCIAL SERVICES						
					Social services with accommodations	
				296	Orphanages and children's boarding homes and hostels	87.9
				297	Homes for the elderly	87.1
				298	Facilities for the mentally retarded and psychiatric convalescent homes	87.2
				299	Facilities for alcoholism or drug addiction treatment	87.2
				300	Temporary homeless shelters and other homes for persons with social or personal problems	87.9
				301	Refugee camps	no code
					Social services without accommodations	
				302	Nurseries and child day-care homes	88.91
				303	Other social services without accommodations	88.99
XVIII. ORDER, SAFETY AND DEFENCE ACTIVITIES						
				304	Military bases and other defense installations	84.22
				305	Police stations, port and marine police, border and coastguard police stations	84.24
				306	Fire brigade	84.25
				307	Justice and judicial installations	84.23
				308	Prisons	no code
XIX. SPORTS						
				309	Football stadiums, with or without track	93.11
				310	Track and field stadiums	93.11
				311	Basketball and volleyball stadiums	93.11
				312	Artistic gymnastics, wrestling, boxing and weightlifting halls	93.11
				313	Tennis courts	93.11
				314	Swimming pools and stadiums	93.11
				315	Shooting ranges	93.11
				316	Ice rinks	93.11
				317	Velodromes	93.11
				318	Racetracks for horse races	93.11
				319	Racetracks for cars and motorcycles	93.11
				320	Golf courses	93.11
				321	Winter sports arenas and stadiums	93.11
				322	Fitness facilities and schools of martial arts and alternative gymnastics	85.51, 93.13
XX. HOUSING AND OTHER ACCOMMODATION						
HOUSING						
				323	Housing, including public/workers' housing and corporate housing	no code
OTHER ACCOMMODATION						
				324	School dormitories and student residences	55.9
				325	Serviced apartments and condominium hotels	55.1, 55.2
XXI. OPEN AND GREEN SPACES						
				326	Urban greenery	no code
				327	Playgrounds	no code
				328	Urban squares	no code
				329	Neighbourhood parks and open green spaces	no code
				330	Botanical and zoological gardens and theme parks	91.04, 93.21

Table A2. Classification of the unitary types of urban uses into super-categories, categories, sub-categories, groups and sub-groups (columns 1, 2, 3, 4 and 5 respectively), on the basis of urbanological and legal criteria and cartographical constraints. Column 6 gives the code numbers of the unitary types of urban uses included in each separate set of uses.

CLASSES OF URBAN USES					
SUPER CATEGORIES	CATEGORIES	SUB-CATEGORIES	Groups	Sub-groups	Codes of unitary types of urban uses included in the class (see: Table A1, column 5)
(1)	(2)	(3)	(4)	(5)	(6)
I. PRIMARY SECTOR					1–16
	AGRICULTURE				1–5
	ANIMAL PRODUCTION				6–10
	FORESTRY AND LOGGING				11
	FISHING AND AQUACULTURE				12–13
	MINING AND QUARRYING				14–16
II. MANUFACTURING					17–69
	MANUFACTURING				17–69
	SMALL INDUSTRY (less than 50 employees)				17–69
	Polluting small industry				17–69
	Production and transmission of electricity				17–19
	Production of raw materials				20–24
	Production of structural raw materials and construction products				25–29
	Manufacture of wooden and paper products				30–31
	Manufacture of rubber and plastic products				32
	Manufacture of glass and ceramic products				33
	Manufacture of metal products				34–36
	Manufacture of textile and leather products				37–41
	Manufacture of food products, beverages and tobacco products				42–45
	Manufacture of chemical and pharmaceutical products				46–47
	Manufacture of vehicles and transport equipment				48–54
	Manufacture of electrical and electronic products				55–56
	Manufacture of optical and magnetic products				57–58
	Manufacture related to printing, reproduction and publishing				59–60
	Manufacture of personal and household goods				61–67
	Materials recovery and other manufacturing				68–69
	Non-polluting small industry				17–69
	(Sub-groups as in the sub-category of Polluting small industry)				17–69
	INDUSTRY (50 or more employees)				17–69
	Polluting industry				17–69
	(Sub-groups as in the sub-category of Polluting small industry)				17–69
	Non-polluting industry				17–69
	(Sub-groups as in the sub-category of Polluting industry)				17–69
III. UTILITIES, TRANSPORTATION AND WHOLESALE TRADE					70–99
	UTILITIES				70–78
	TRANSPORTATION				79–90
	TRANSPORTATION				79–90
	Passenger transport				79–84
	Freight				85–90
	PARKING FACILITIES				91–92
	WHOLESALE TRADE AND WAREHOUSING				93–99
	WHOLESALE TRADE				93–98
	WAREHOUSING				99
IV. RETAIL TRADE AND RECREATION					100–212
	RETAIL TRADE				100–195
	GENERAL RETAIL TRADE				100–161
	Daily retail trade				100–115
	Retail trade in food and beverages				100–111
	Other daily retail trade				112–115
	Occasional retail trade				116–136
	Retail trade in clothing and footwear				116–119
	Occasional retail trade in personal goods				120–124

Table A2. Cont.

CLASSES OF URBAN USES					Codes of unitary types of urban uses included in the class (see: Table A1, column 5)
SUPER CATEGORIES	CATEGORIES	SUB-CATEGORIES	Groups	Sub-groups	
(1)	(2)	(3)	(4)	(5)	(6)
				Other occasional retail trade	125–136
				Infrequent retail trade	137–160
				Infrequent retail trade in personal goods	137–143
				Retail trade in household goods	144–146
				Retail trade in motor vehicles and motorcycles	147–150
				Other infrequent retail trade	151–160
				Retail trade without the physical presence of the customer	161
				RETAIL TRADE IN SERVICES	162–195
				Retail trade in services	162–177
				General retail trade in services	162–174, 321
				Leasing	175–177
				Repairs	178–195
				Repair of personal and household goods	178–183
				Repair of motor vehicles and motorcycles	184–191
				Repair of machinery and equipment	192–195
				RECREATION	196–213
				HOTELS, CAMPINGS AND SIMILAR ACCOMMODATIONS	196–200
				SPECIALISED RECREATIONAL SERVICES	201–213
				Recreational services in food and beverages	201–204
				Recreational services that also provide food and beverages	205–208
				Other specialised recreational services	209–213
				V. OFFICES	214–271
				OFFICES	214–271
				PUBLIC ADMINISTRATION	214–217
				PRIVATE OFFICES	218–271
				General offices	218–265
				Offices of unions, organisations, clubs and associations	218–223
				Offices of financial services and insurance	224–233
				Offices of professional services	234–240
				Offices related to publishing, telecommunications and media industries	241–249
				Personal services	250–264
				Ancillary offices	265–271
				VI. EDUCATION, RESEARCH AND CULTURAL ACTIVITIES	272–291
				EDUCATION	272–281
				PUBLIC EDUCATION	272–278
				Primary education	272–273
				Secondary education	274–275
				Post-secondary and tertiary education	276–278
				PRIVATE EDUCATION	
				Primary education	272–273
				Secondary education	274–275
				Post-secondary and tertiary education	276–278
				Other educational activities	279–281
				RESEARCH ACTIVITIES	282
				CULTURAL ACTIVITIES	283–291
				General cultural activities	283–288
				Religious activities	289–291
				VII. HEALTH AND SOCIAL SERVICES	292–303
				HEALTH	292–295
				PUBLIC HEALTH	292–293
				PRIVATE HEALTH	292–295
				SOCIAL SERVICES	296–303
				Social services with accommodations	296–301
				Social services without accommodations	302–303
				VIII. ORDER, SAFETY AND DEFENCE ACTIVITIES	304–308

Table A2. Cont.

CLASSES OF URBAN USES					
SUPER CATEGORIES	CATEGORIES	SUB-CATEGORIES	Groups	Sub-groups	Codes of unitary types of urban uses included in the class (see: Table A1, column 5)
(1)	(2)	(3)	(4)	(5)	(6)
					ORDER, SAFETY AND DEFENCE ACTIVITIES
					304–308
					IX. PUBLIC SPORTS
					309–322
					PUBLIC SPORTS
					309–322
					X. HOUSING AND OTHER ACCOMMODATION
					323–325
					HOUSING AND OTHER ACCOMODATION
					323–325
					HOUSING
					323
					OTHER ACCOMMODATION
					324–325
					XI. OPEN AND GREEN SPACES
					326–330
					OPEN AND GREEN SPACES
					326–330

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