

Mass Appraisal Techniques Combined with GIS Ownership Transfer Project in the Israel Land Authority

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Key words: Ownership transfer, Area Price, G.I.S , price layers, ILA

SUMMARY

Israel Land Authority (ILA) is the government institution that manages over 90% of Israel's land. The ownership of this land is registered to one of the three following institutes: the State of Israel, the Development Authority, and the Jewish National Fund.

Government decision number 117 decreed a reform to the state lands and to transfer a part of the built area ownership to the currently lessee holders.

During the transition from lease to ownership, the Israel Land Authority charges the value difference between lease to ownership, and the lessee can be registered as the owner at the Land Registry bureau.

Before commencing this operation, it is necessary to know the value of the leased land to determine the difference between full ownership and lease, and thus it is needed to assess each property. The Department of Valuation and Mapping division at the Israel Lands Authority have joined efforts to build a layer of 'price areas'. Instead of assessing each property on its own, it was decided to set a fixed 'price area' to properties in the same neighborhood that share common characteristics and values.

After the completion of the assessment, the 'price area' is assimilated into the GIS as a layer, and by intersecting the 'price area' layer with the ILA cadastral layers we can determine the market value of each property. From this value we can determine the lessee holder's required payment to the ILA.

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ISRAEL'S LAND POLICY – ISRAEL LAND AUTHORITY

Israel Land Authority is the government institution that manages the state lands. State lands comprise 93% of Israel's area (approximately 22 million dunam) and are owned by three bodies: The Jewish National Fund, the Development Authority, and the state. These lands are considered public lands and are in part leased to the public of the State of Israel. The additional 7% are privately owned lands.

The national land ownership principle is one of the corner stone's of Israel and was set by one of Israel's Basic Laws in 1960. This law decreed that the ownership of state lands won't be transferred without a specific permission in the law.

This situation where the majority of lands are owned by the state is different than the situation in most other countries. It is a result of a few unique historical characteristics of Israel. For the collective salvation of the land and the ownership of the land by the Jewish people there is a central place in the Zionistic ethos that stems from the biblical creed " The land shall not be sold forever" (Lev. 25:23 KJB).

The Authority's main areas of activity are managing land registry, creating land reserves for different applications, marketing lands, treating the lessees and residents, and regulating the different uses of the land.

TRANSFERRING OWNERSHIP

Transferring ownership is a part of Israel Land Authority reform that was meant to better governmental mechanisms of managing real estate. There will be ownership transfer to the lessees in areas designated for housing and employment, as well as allocating lands by selling instead of leasing. The reform means converting the lessee's rights from 'lease' to 'ownership,' so the lessee will be listed in the Land Registry as the owners of the property.

THE CURRENT SITUATION

Today, ILA must agree, being the owner of the land, to changes lessees want to be performed on the properties they have been leasing, starting from enclosing a balcony through to transferring rights. This situation creates a lot of friction between the public and the authority, leads to unnecessary

delays, and burdens ILA in a way that makes it difficult to perform the core assignments of Israel land management.

THE SUGGESTED SOLUTION

In order to improve and make the processes in the authority more efficient and reduce the friction between the citizens and the authority, two alternatives were examined in a committee that was established just for that – the Gadish committee. The first alternative suggested by the committee is leasing the full rights, current and future, on the land. The second alternative is giving full ownership of the land. The second alternative was chosen, claiming the first alternative, 'leasing', is like factual ownership but the land would still be managed by the authority and that wasn't the intent.

OWNERSHIP GOALS

The option of transferring ownership will have a positive effect on both ILA and the citizens by minimizing the bureaucracy the citizens face while wanting to perform various acts on the property, such as: building additions, changing designation, transferring rights etc., and forgoing the payments the citizen must pay when performing these actions.

In addition to all that has been mentioned previously, in a macro-economical view, giving ownership to the citizen will affect the market greatly: shortening the planning processes, lowering the price of lands and housing, and adding growth in the market. It will also encourage the private and municipal initiative for detailed planning and development of lands.

WHAT LANDS ARE INCLUDED?

The ownership won't be transferred from all state lands. The previously mentioned regards lands designated for housing and employment with capitalized contracts only. Transferring the ownership is not a must, but is permissible. All in all, transfer to private ownership will be applied to 1% of the area of the State of Israel, in such a delicate situation, most lands will still be owned by the state, JNF, and the Development Authority.

APPRAISAL

The ILA will transfer ownership in properties where transferring ownership is exempt from payment and in properties where the transferring of ownership requires payment. The payment for ownership will be determined as a certain percent of the value of the property. In order to determine the land value of the existing property, there is a need to perform land appraisals on a national scope.

In land designated for housing there can be discerned two main types of constructions – densely populated urban areas and low rise constructions. All the contracts in densely populated urban areas will be transferred to private ownership without any payment, so there is no need to perform land appraisals.

Low rise construction contracts are separated into several groups, each with a different payment scheme:

- The first group of properties is properties whose land area is smaller than 280 m², ownership in this group will be transferred without any payment and so there is no need to appraise this land.
- The second group of properties is properties whose land area is between 280 m² and 640 m², transferring these properties requires payment.
- The third group of properties is those with land area of 640 m² to 1000 m², transferring these properties requires payment.

Both property groups that require payments will have a land value table prepared by the full worth of the rights by the applicable planning data, and from it the payment for ownership transfer will be determined, according to the rates set in the committee decision.

Another group of properties will include properties with an area of 1 dunam to 16 dunam, ownership in these properties will be transferred for 31% of the difference between the leasing rights and the ownership rights according to individual assessment conducted for each property. In properties where the area is larger than 16 dunam the ownership won't be transferred, as was decided in the principles of land ownership policy.

WORK PROCESS WITH THE AUTHORITY APPRAISERS

In order to assess the value of the properties by the appraisers, all the leasing contracts of low rise construction that meet the required criteria will be mapped. After mapping the contracts, maps with the properties and all the relevant information will be produced for the appraisers field work.

Maps with the areas where the properties are located will be distributed to the Authority appraisers by the National Appraiser. The appraisers will conduct assessments of the properties, where the value will be determined by whole areas containing the properties, and not necessarily the properties themselves. Price areas will include the properties and will give future reference for similar properties in the same price area. The concept is to cover built areas owned by the Authority that in case a single property will be accidentally skipped over, there will be the possibility to transfer ownership by future geographical intersection.

THE PRINCIPLES IN PERFORMING THE APPRAISALS

1. The appraisal will be for the full ownership of the empty property and without consideration of existing buildings.
2. The price values that will be determined will reflect the full planning potential, current and future, that may exist in the various lots.
3. Appraising the property will include the potential planning changes, as they may exist, while taking into consideration rejection risk and the required payments for application.

4. The land will be assessed by the appraiser without development expenditure, taking into account standard normative development expenditures or the municipality's fees and taxes, according to the custom in the area.

Every appraiser allocated a work area will conduct a preparatory meeting with the National Appraiser of the Authority, where there will be presented to him the principles of the work, his work areas, and also the maps of the price areas he is to determine. The final product the appraiser must produce is a map that has been divided according to the price areas and a land value table for the price areas marked on the map.

Upon the completion of the appraisal, the appraiser will transfer the data (the map with price areas and the land value table) to the professional committee where the National Appraiser of the Authority will review the assessments.

Producing the maps and constructing the price layers is done in the GIS (Geographic information system). The GIS of the authority is used as the main platform of managing the project.

GIS as a Central Tool to Determining Price Areas for Transferring Lease to Ownership

The Engineering Challenge

After mapping all the properties where ownership transfer will be possible for payment, it appears that about 140,000 low rise construction properties are supposed to transfer from the state ownership to the lessee ownership. The work areas were divided to the 6 ILA regions: North, Haifa, Center, Tel Aviv, Jerusalem, and the South, that include within them approximately 1900 municipal regions. The main work tool of the appraiser is a map that shows the properties he needs to assess and their immediate surroundings. In setting work guidelines, it was decided that each appraiser will receive a range of properties belonging to one municipal region, and the maps were made according to that.

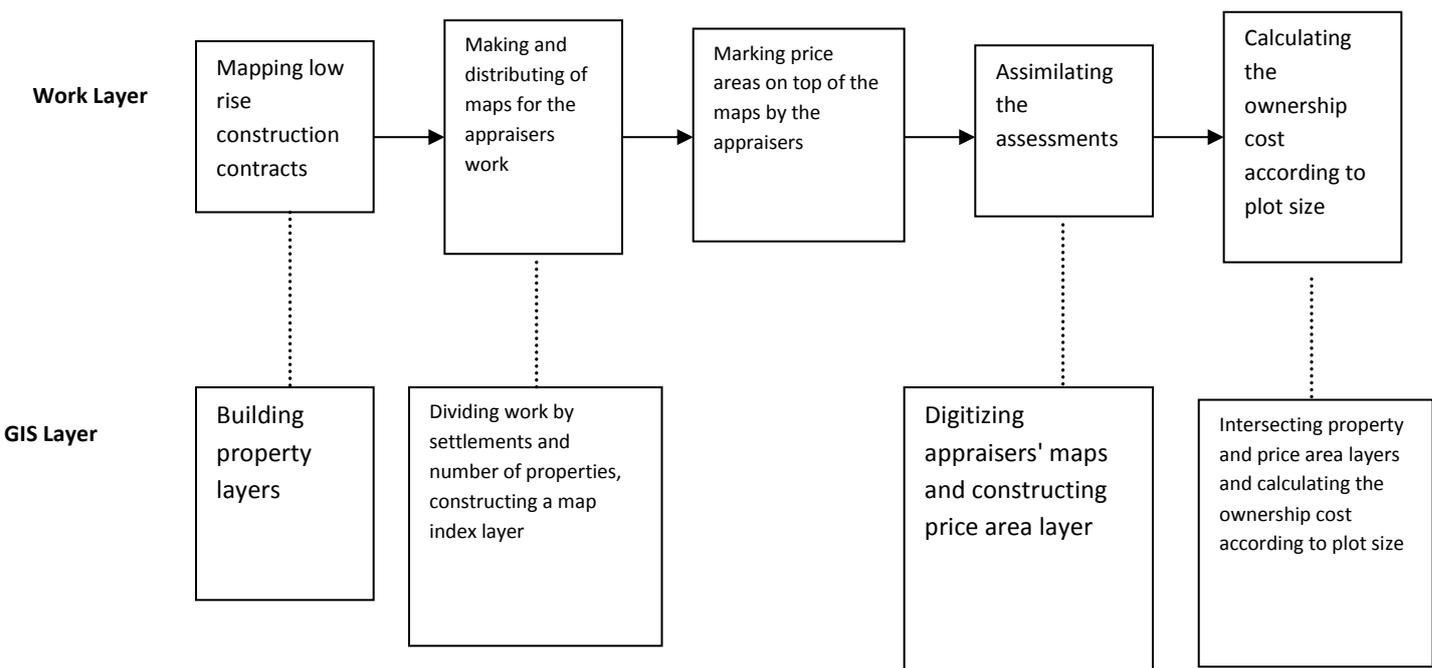
After producing the maps for the appraisers, there is another part of the process that needs to be taken into account: assimilating the price areas that were marked on the maps. Assimilating those polygons (price areas) should also address the final product of the process – calculating the ownership cost. The GIS addresses the above mentioned process, and also the automation of several sub-processes.

When we begin to use "GIS terms", the whole picture begins to clear up. The final product we want to receive is a geographical layer of the properties with a field of the specific land value of each property. To get the layer that will give the value of a property and from which the future payment for ownership transfer will be derived, there is a need of several background layers. The first layer is properties with low rise contracts; this layer is built by an alphanumerical table of the properties that is received from alphanumerical systems of the Authority. The second layer is the national cadaster where each lease is determined by a whole parcel, and the third layer is the price area layer

that will be constructed from the appraisers' material (polygons marked on the maps). Given these three layers, it is possible to create a geographical intersection that gives us the land value of each property.

Managing GIS

The final product of the process is a list of all the properties where ownership transfer is possible, where each property has a field with its value. The GIS, on the one hand, supplied the work material for the appraisers, and on the other hand, is used as a collecting mechanism for the assembly of the price area data.



Constructing Properties Layer

The authority manages its property registration in an alphanumeric system called the 'Assets Book'. The Assets Book is the database of an alphanumeric table without any geographical relation. The Assets Book is managed on the parcel level, so each property is defined by complete block and parcel.

In order to find all the low rise construction contracts, there are several filtering processes applied on the alphanumeric data of the properties:

1. Filtering by contract – low rise construction contracts. Densely populated urban area contracts are transferred without payments, so there is no need for appraisal.
2. Filtering by priority areas and areas along the border – national priority areas are determined occasionally by the government and the payment rates there are discounted greatly.
3. Filtering by the area – according to the ownership transfer principles table that has been determined by Israel Land Committee.

After the production of the table, there is a merge of matching records between the table and the national cadaster layer by combining the fields of block and parcel - $Join_Field=Block*10000+Parcel$. This creates a property layer that includes all the property details in the GIS. The merging process is a geographical mapping of the properties in a single parcel resolution, even if the property doesn't necessarily cover the whole parcel and the exact location of the property within the parcel is unknown. Thus, if there is no parcellation, the property's location is uncertain.

Generally, all the properties are converted from the table database into a geographical layer whether they cover a complete parcel or only a part of it. There are properties yet to be parceled and they are still undefined by whole block and parcel, and as such, cannot be registered for ownership in the Land Registry. Those kinds of properties will be dealt with at a later stage when the parcellation will be registered. However, it may be that the appraisers will define a price area of such an area that will be assimilated based on land registry plans in production or valid zoning plans, and when the division will be registered, the owners will be able to pay the fee, gain ownership of the land and register at the Land Registry as owners.

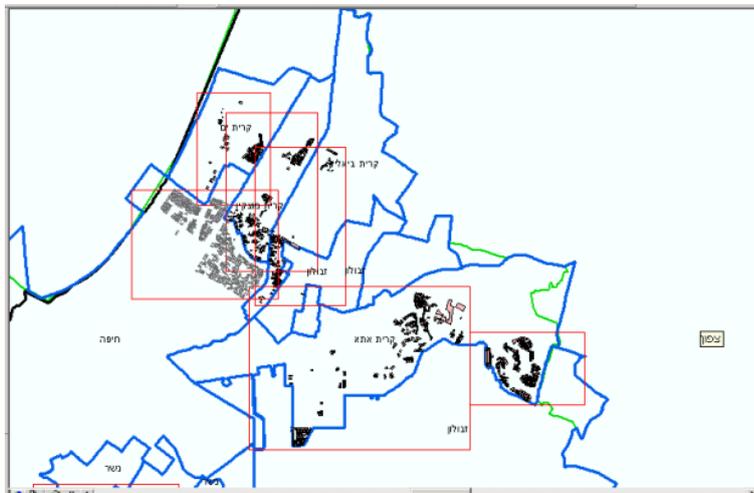
Creating a Map Indexing Layer

The maps will be central tools for the appraisers, for building the final layer will be based on the appraisers' marks on the map.

The GIS is used in creating all the maps according to managing principles that were determined:

1. Each map will include a single municipal area.
2. The maps are built in the GIS while showing the properties where appraising is needed. In order to create the maps, we made the index layer which allows to manage dividing the maps for the appraisers.
3. All municipal areas with properties were mapped, and each area will be assessed by a different appraiser.
4. There are populated areas that because their size don't fit in one map within a reasonable scale. These areas will be mapped in several maps and there was set a scale of 1:5,000 for each map – the minimal scale an appraiser can practically use in field work and all the layers are still clearly visible.
5. The maps sheet size will vary according to scale constraints.

The map index layer is a layer of map sheets. Each sheet size has been calculated in Israel coordinate system as a virtual polygon by forcing the 1:5,000 scale. A0, A1, A2, A3, A4 sheets were constructed and fit to each municipal area that includes properties. Each polygon in the map index layer is a map that will be used by a single appraiser. The index layer is used as a managing tool to update status in the process of building the price area layer. Each appraiser is responsible for one municipal area and has a map that matches that same municipal area.



Cartographic Aspects of Making the Work Maps for the Appraisers

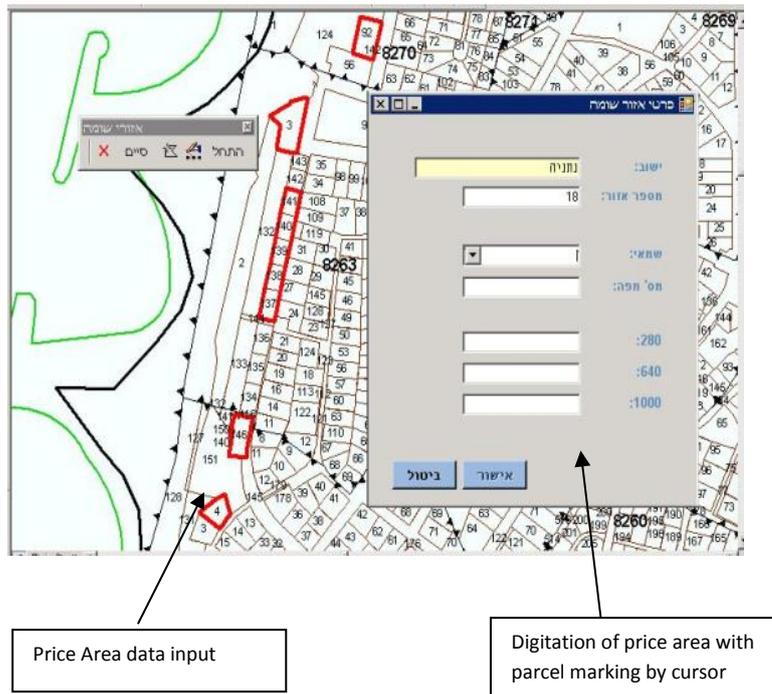
Each polygon in the map index layer will be a base of creating a set of maps for the appraiser. The set includes 3 basic maps:

1. Work map – a work map includes the property layer, the cadaster layer, and the street layer. This is a work map that is used to mark price areas and will be the basis for the future digitization of the price areas.
2. Zoning map – a map that includes the property layer and valid plans. The map will be used for information of the plan applied in the area, to help the assessment.
3. Orthophoto map – Orthophoto map with the street names, to assist in navigating in the field.

Digitizing the Appraiser Maps

As previously mentioned, constructing the price areas layer is the basis for calculating the property value for each contract separately. The appraisers mark the price areas on top of the work maps (streets, cadaster, and properties). Each appraiser arrives at the national mapping department in order to assimilate the marked polygons on the maps and entering them into the national GIS.

Each price area is determined by several complete parcels, for the contract resolution is one whole registry unit – a whole parcel. In order to simplify the digitization process, taking into account the work resolution, an application was developed with which we can sample the appraiser's price area easily and also prevent the user that will perform the assimilation from dividing a parcel, making it possible to only assimilate whole parcels. The application is GIS based and allows marking whole parcels or blocks and defining an area by assimilating alphanumeric parameters, such as the appraiser's name, area number, prices and more (see diagram 3).

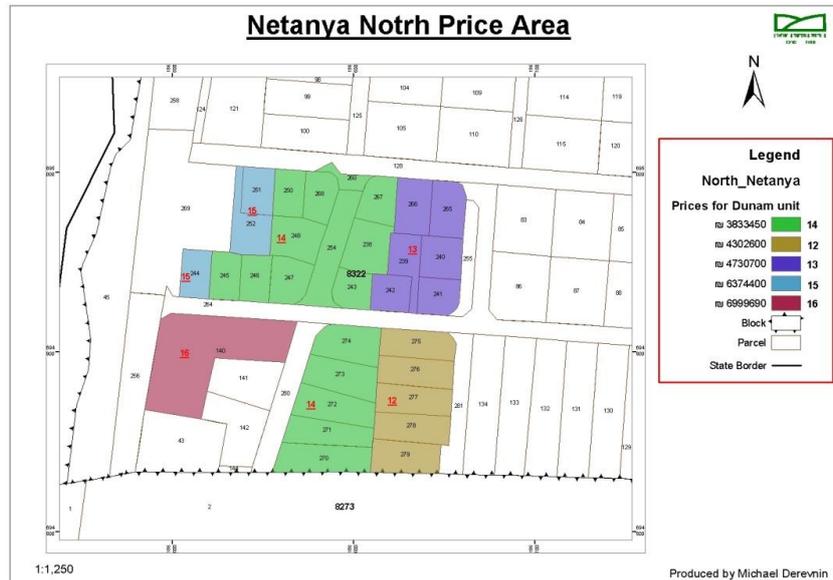


The work process:

1. Marking polygons (parcels/blocks) that define price areas by looking at the appraiser work map.
2. Merging the polygons that are one fixed price into one polygon.
3. Assimilating alphanumeric parameters about the area (assessment and management parameters).
4. Inserting the polygon to the price area layer.

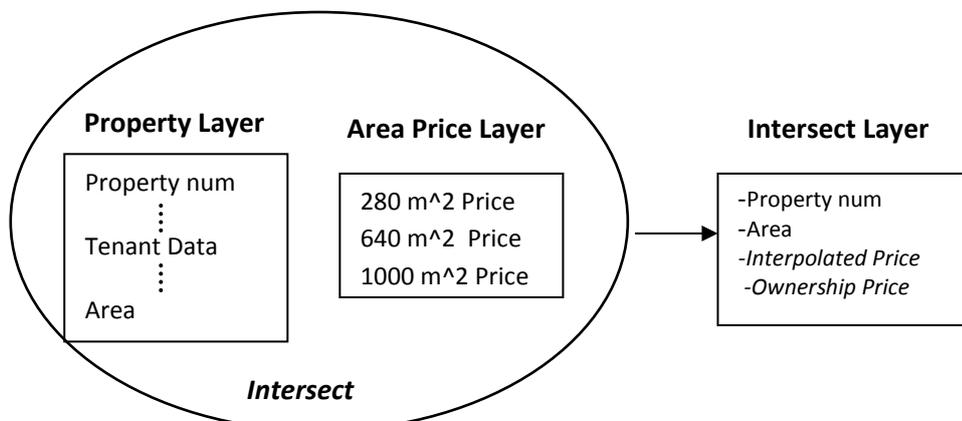
Naturally, the first option chosen to assimilate the data from the work maps is scanning the maps and 'regular' digitization of the polygons while updating the fields in the layer. The aforementioned option requires resources and takes up valuable time. In order to spare the scanning process (that usually includes scanning A0 sheets) of approx. 1000 maps and to prevent parcel cuts by the sampler, a process of 'trace digitization' has been created. This process simplifies the assimilation and betters performance in comparison to classical digitization of polygons based on scanned maps.

North Netanya (Central District) Land Prices for 1 Dunam after digitization:



Calculating Ownership Cost

Based on property groups (see Appraisal chapter), threshold prices were determined to be assimilated into the 'price area' polygon. The authority appraisers determined 3 prices for differently sized properties that were predetermined: a price for a lot sized 280 m², a price for a 640 m² lot, and a price for a lot sized 1000 m². Since the properties are heterogenic in size, there is a need to perform a linear interpolation between the three determined prices in order to deduce a value of a certain lot at the end of the geographical intersection between the price area layer and the property layer.



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FIG Working Week 2016
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Summary and Conclusions

Creating the price area layer and saving it within the GIS is a breakthrough in real estate management.

Building such a layer and updating it requires many financial resources and human resources that include appraisers, cartographers, GIS specialists, computer personnel, many finance and authority personnel and drafters. The GIS is the executing branch of the ownership transfer project and manages all the assimilated data with constant updating.

The more price areas added, the bigger the layer will be, and it will be used more widely. As with each GIS layer, this layer must be updated, though much more frequently – updating once a year according to the expiration date of the assessment.

Other than Israel Land Authority, the updated price layer imparted in the GIS can be used by many other government bodies: the Tax Authority, city and regional councils, and private bodies such as real estate appraisers and planners.

REFERENCES

Israeli government decision No. 117 (IMI / 5) on land reform)
Council Resolution 1185 dated 28.12.09 on reform at lands of Israel , that was canceled by Council Resolution 1299 dated 06.11. 13, that was canceled by Council Resolution 1370 dated 22.06.14.

BIOGRAPHICAL NOTES

Eng' Avi Hallewa: A licensed surveyor (since 2002) and a registered professional engineer (Since 2000) from the Technion - Institute of Technology, Haifa, Israel.

Certified Land Assessor from the Technion, Haifa, Israel.

MBA with concentration in Real Estate and Valuation - Haifa University, Israel

- Senior Department Manager for Mapping, Surveying & GIS in the Israel Land Authority (since 2013).
- Head of mapping and measurement in Israel Land Administration & Head of the Municipal registry center (2010-2013).
- Director of Mapping and measurement Dept in Jerusalem District of Israel Land Administration (2005-2010).
- Worked in a private firm as a surveyor (2000-2005).
- Certified real estate appraiser since 2004

Mr Doron Haziza: Certified real estate appraiser since 2003 (License no. 1122 from State of Israel)

Education: Certified Land Assessor from the College of Management, Israel.

- Member of the Real Estate Appraisers Association in Israel

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- Worked in a private firm as a real estate appraiser (1998-2006).
- Senior Partner in a private firm of real estate appraiser (2006-2011).
- Owner of independent real estate appraiser since 2011 till today

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