



INSTITUTO NACIONAL DE ESTATÍSTICA
STATISTICS PORTUGAL



FIFTH INTERNATIONAL WORKSHOP ON BUSINESS DATA COLLECTION METHODOLOGY

19-21 SEPTEMBER 2018 – STATISTICS PORTUGAL, LISBON



Use of computing mobile devices in the Economic Censuses for updating the Mexican Statistical Business Register and georeferencing establishments

INEGI, Mexico
20 september 2018

Economic Censuses: the most complete and detailed source of basic economic information of Mexico



It contains, in high detail,
the characteristics of the
national economy



Data on all the economic activities, at
any level of geographical detail



It is used in several public, private,
academic and social projects



DENUE, a product of the Economic Censuses

Economic
Censuses
every 5 years



Updating the
whole SBR
every 5 years

National Statistical
Directory of
Economic Units
(DENUE)

INEGI Inicio Datos Servicios Transparencia Investigación

Inicio / Servicios / Directorio Estadístico Nacional de Unidades Económicas

DENUE Directorio Estadístico Nacional de Unidades Económicas

Actividad económica Tamaño del establecimiento Área geográfica Buscar Consultar Nueva búsqueda

Ir a INV

Establecimientos económicos

- ABS DE MÉXICO
Jesús María, AGUASCALIENTES
- CENTRO ACUÍCOLA PABELLÓN DE HIDALGO
Rincón de Romos, AGUASCALIENTES
- FRUTAS ORGÁNICAS DE MÉXICO, S.A. DE C.V.
Calvito, AGUASCALIENTES
- GRANJA ACUÍCOLA ARROYO DE LOS CABALLOS
S. CABALLOS

MENUDOS ROSI
Actualizar información del establecimiento

CALLE JOSÉ MARÍA MORELOS
COLONIA CENTRO C.P. 20900
AGUASCALIENTES, JESÚS MARÍA, JESÚS MARÍA

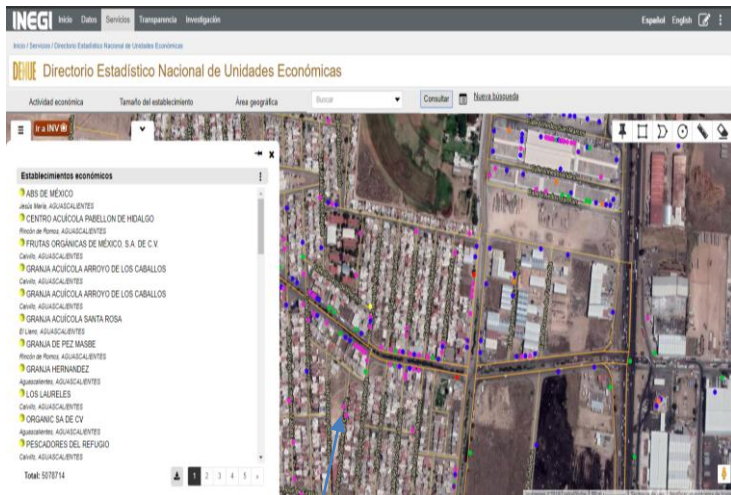
Razón social:
Código de la clase de actividad: 722513
Nombre de la clase de actividad: Restaurantes con servicio de preparación de antojitos
Personal ocupado

Public and free



The DENUE is a highly demanded product due to its characteristics :

All businesses of the country are located there, assembled in a GIS



Every establishment appears represented in the digitized cartography, at the exact corresponding place, identified by means of a dot

Businesses are classified according to **economic activity** based on an international classification system (NAICS)

It contains **business data on identification, location and size**, of every single business of the country

COMEX INDUSTRIAL COATINGS SA DE CV
[Actualizar información del establecimiento](#)

VÍA GUSTAVO BAZ #3999
SAN ANDRÉS ATENCO C.P. 54030
MÉXICO, TLALNEPANTLA DE BAZ, TLALNEPANTLA

Actividad económica:	Fabricación de pinturas y recubrimientos
Personal ocupado:	101 a 250 personas
Teléfono:	
Correo electrónico:	
Sitio en internet:	
Tipo de unidad económica:	Fijo
Fecha de incorporación al denue:	JULIO 2010

[Inf. comercial](#)
[Inf. adicional](#)

More than 60 thousand searches per month 5

With all these characteristics, the user can search exactly the universe of his or her interest, by choosing the specific activities he or she wants to search

DENUE Directorio Estadístico Nacional de Unidades Económicas

The screenshot displays the DENUE web application interface. At the top, there are navigation tabs for 'Actividad económica', 'Tamaño del establecimiento', and 'Área geográfica'. Below these, there is a search bar with the text 'Buscar actividad económica' and a search icon. To the right of the search bar are buttons for 'Consultar' and 'Nueva búsqueda'. A dropdown menu is open, showing a list of economic activities with corresponding colored icons and plus signs. The list includes: 'Todas las unidades', '(11) Agricultura, cría y explotación de animales, aprovecham...', '(21) Minería', '(22) Generación, transmisión y distribución de energía eléct...', '(23) Construcción', '(31-33) Industrias manufactureras', '(43) Comercio al por mayor', '(46) Comercio al por menor', '(48-49) Transportes, correos y almacenamiento', '(51) Información en medios masivos', '(52) Servicios financieros y de seguros', '(53) Servicios inmobiliarios y de alquiler de bienes muebles ...', '(54) Servicios profesionales, científicos y técnicos', '(55) Corporativos', '(56) Servicios de apoyo a los negocios y manejo de desecho...', '(61) Servicios educativos', '(62) Servicios de salud y de asistencia social', '(71) Servicios de esparcimiento culturales y deportivos, y otr...', '(72) Servicios de alojamiento temporal y de preparación de ...', '(81) Otros servicios excepto actividades gubernamentales', and '(93) Actividades legislativas, gubernamentales, de impartició...'. On the right side of the interface, there is a map showing a satellite view of a city area with numerous colored dots representing economic units. The dots are color-coded according to the activity categories listed in the dropdown menu. The map includes various labels for neighborhoods and landmarks, such as 'El Barreno', 'Los Vázquez', 'Paseo Blanco', 'San Marcos', 'Los Sauces', 'Los Arboles', 'Belmundo Fraccionamiento', 'San Miguel Residencial', 'Vinedos Eral Fraccionam...', 'Tepepatlán', 'Marselana (Condominio Residencial)', 'Santa Catalina (Condominio)', 'San Juan Residencial', 'ESTRADA ALBA (Fraccionamiento)', 'Arboleda (Condominio)', 'La Loma de Maravillas', 'Cerritos', and 'Baranico'. The map also features standard navigation controls like a pin, zoom in/out, and a compass.

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The DENUE is in a GIS, developed by INEGI, where the user can visualize more than 240 layers of information:

Mapa Digital de México

Ir a www.inegi.org.mx

Unidades económicas: 4,145,415
Industria manufacturera, Comercio y Servicios privados no financieros

Nacional

Actividad: Manufactura Comercio Servicios Todos

Información Económica

Variables económicas

- Unidades económicas
- Personal ocupado total
- Personal ocupado no remunerado
- Personal ocupado remunerado
- Personal ocupado suministrado
- Gastos por consumo de bienes y servicios
- Ingresos por suministro de bienes y servicios
- Activos fijos totales

Eventos: 2004 2009 2014

DHL GLOBAL FORWARDING MEXI...

Nombre de la clase de actividad: Servicios de mensajería y paquetería foránea

Domicilio: AVENIDA LICENCIADO ADOLFO LÓPEZ MATEOS ORIENTE 1001 1001, INTERIOR 19 20 Y 22 PH 4, PISO PENTHOUSE, EN PLAZA KRISTAL EDIFICIO PLAZA KRISTAL, 19 20 Y 22 TORRE A, LOCAL 19 20 Y 22, COLONIA SAN LUIS, CODIGO POSTAL 20250, EN AGUASCALIENTES, AGUASCALIENTES, AGUASCALIENTES

Número de teléfono: 4499948865

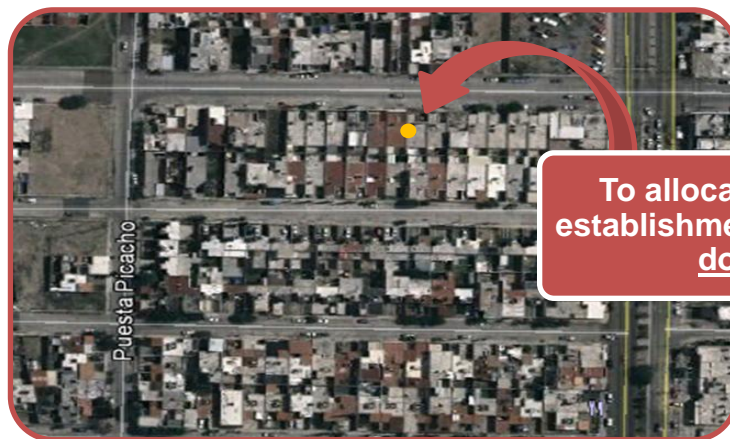
Capas de información

- Infraestructura vial: Pavimento de calles
- Establecimientos económicos DENUE
- Censos Económicos
- Vías férreas (1997-2007)

In this example, the chosen layers are: the DENUE, Economic Censuses, railways, and paved streets



But first of all, it is necessary...



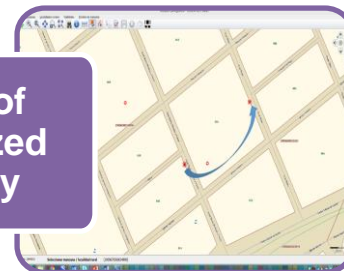
To allocate each establishment with its dot

By means of two esencial elements:

A Computing Mobile Device (DCM, its acronym in Spanish)



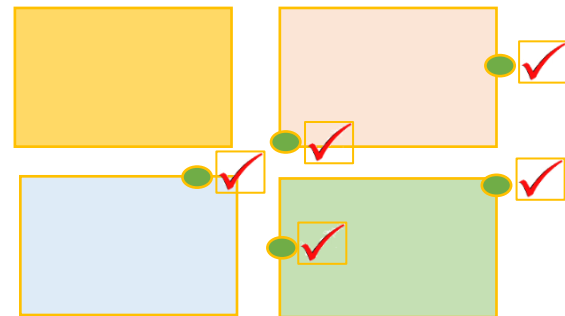
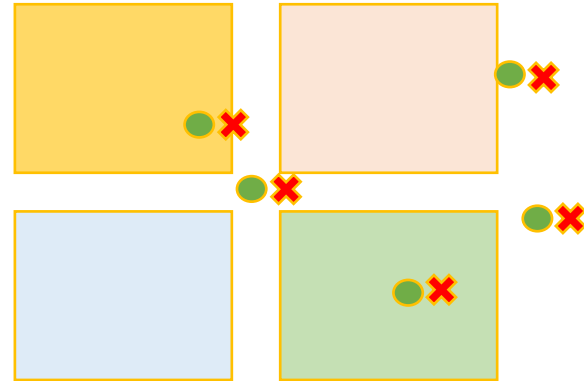
and inside of it...the digitized cartography





Why not allocating the dot with a GPS?

- The error with GPS could get as far as 30 meters, therefore the dot could be located even in a different block
- With digitized cartography in DCM, and satellite images, the interviewer established himself in the right location and more easily, and allocated the dot in the correct place, at least in the correct block and front of block





DCM for capturing census data: first steps



A PDA was used for
CE2004

First “experiment”,
Economic Censuses
2004

10% of geographical areas in EC2004
were covered with a DCM

Limited capacity, but it allowed to capture
street names and, during the interview, to
allocate them automatically

The objective of the
experiment was achieved: to
prove that the use of the DCM
was feasible and convenient
for census data collection

In CE2009, the DCM was used for the whole census data collection

Before 2014, INEGI concluded the digitalization of the cartography, including street names, and it was incorporated into the DCM



Both blocks and streets keys were automatically allocated into the questionnaires

The interviewer could locate the exact location of each establishment and to assign it in the digitized cartography, as a dot



In EC2014 a more advanced DCM was used

With the development of technology, the DCM acquired for EC2014 was substantially better. The conditions searched for were:



A bigger screen that enabled the inclusion and visualization of long texts

Higher capacity of memory and processing

That the DCM were still light, but with “heavy duty” characteristics



Tools added to DCM, for EC2014:

Systems: cartographic module, operational routine, questionnaire's validation, automatic classification and data safety protocol

Digitized cartography

Satellite images

Workload

Catalogues and operative manuals

Registration of progress per blocks and establishments

Questionnaire and validation system

Directory of economic units

Portable keyboard, help with concepts, calculator, warning messages



By using these tools, INEGI obtained:

- ✓ Lesser time of interview and less re-enquiries
- ✓ Full updating of DENUÉ
- ✓ Exact location of each establishment in the geographical space
- ✓ Higher speed, agility, efficiency and quality in data processing and transmission, when compared to a PDA
- ✓ Longitudinal follow up of each DENUÉ's establishment



This way, in EC2014, more than 5 million establishments in the country were georeferenced, as well as 26 million of dwellings, and all the empty properties



From paper to DCM...



Defining highly in advance the census questionnaire, validation criteria, operative strategy and detailed planning



Establishing, beforehand, the logistics for data collection, supervisions, and training strategies



Preparing all capturing and follow up systems, also ahead of time



Savings in Census data collection through DCM

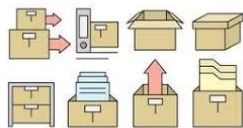


- Paper (and trees), printing of questionnaires and transport

- Wages of data “validators”

- Wages of data transcribers

- Wages of supervisors of capturing



- Leasing spaces and buying computers

- Storage of questionnaires

- Reduction in the number of re-visits to the respondent

- **Using DCM represents saving of 20% in relation to previous data collection conducted in paper**



Other benefits of using the DCM



✓ Homogeneity during the development of the interview

✓ Faster and more accurate data collection and data updating

✓ More timely data release

✓ Immediate data transmission

✓ Easier control and follow up of the census data collection activities

✓ Easier staff training



Conclusions

Using Computing Mobile Devices has enabled:

- Saving resources
- Improving data quality
- More control during data collection
- More control in data revision
- Improving training processes for interviewers



- More timely data release
- Creating new products such as the directory of establishments in the digitized cartography
- To have the support of the geography in the DCM to locate data in the place where they occur:

**Georeferenced
Statistics**

Changing from paper to DCM is a complex process, but it worths it



A couple of questions for the audience:

1. What problems have you had concerning the use of the DCM in census data collection?

2. What advantages have you had concerning the use of the DCM in census data collection?