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The 1st International Conference on Computer, Science, Engineering and Technology

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1st International Conference on Computer, Science, Engineering and Technology (ICComSET)

PREFACE

It's our great pleasure to welcome you to the 1st International Conference on Computer, Science, Engineering and Technology (ICComSET-2018), Tasikmalaya, West Java, Indonesia from 27-28 November 2018.

The International Conference on Computer, Science, Engineering and Technology (ICComSET-2018), provides an excellent international forum for sharing knowledge and result in theory, methodology an applications of Computer, Science, Engineering and Technology in theoretical and practical aspects. The aim of the conference is to provide a platform to the researchers and practitioners from both academia as well as industry to meet and share cutting-edge development.

ICComSET-2018 secretariat has received 250 submissions from 6 countries: Malaysia, Taiwan, India, Mexico, Tunisia, and Indonesia. The new program held in the City of Tasikmalaya was organized by the Universitas Muhammadiyah Tasikmalaya (UMTAS) at Santika Hotel, Tasikmalaya from 27-28 November 2018, and supported by several universities including: STIKES Bakti Tunas Husada, Universitas Perjuangan Tasikmalaya, STIKES Muhammadiyah Ciamis, Universitas Muhammadiyah Sidoarjo, and Indonesian Collaboration Publication Community (Komunitas Kolaborasi Publikasi Indonesia/ KO2PI).

Each paper has been reviewed by the program committee. Only 166 paper were accepted for the oral session (acceptance rate: 65.3 %). The conference program consist of 3 keynote speakers (90 min), 6 Invited speakers (120 min), 5 parallel session, one poster session and a round table.

We would like to thank scientific committee, and reviewers, as well as the committee of the Universitas Muhammadiyah Tasikmalaya who have participated in the success of this event so that this event can be held as planned. We also conveyed to the Rector of Universitas Muhammadiyah Tasikmalaya who had supported this event both in terms of finance and other supporting facilities.

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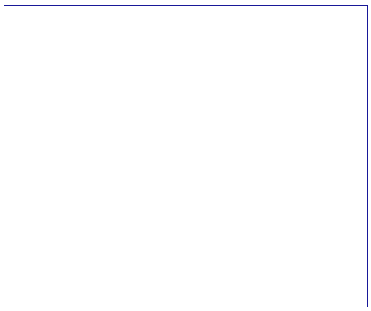

Spatial Solution for Lower Class Vertical Housing. Case Study 'Rusunawa' Tambora, Jakarta, Indonesia

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Spatial Solution for Lower Class Vertical Housing. Case Study 'Rusunawa' Tambora, Jakarta, Indonesia

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Abstract. The construction of lower class vertical housing is a solution provided by Jakarta government to solve the problem of slums and densely populated settlements. Residents were relocated to the apartment unit that was built with the aim of providing a comfortable residence, but many residents who complained about the flats could not accommodate their activities. In residential design, the activities and needs of residents must be accommodated in the dwelling so that it can function optimally. This research is aimed at finding spatial arrangements that are suitable for the needs of residents in simple rental apartments. This research was conducted in 'Rusunawa' Tambora, which was completed in 2015, by examining one unit of each tower within three towers. Research uses qualitative methods with data collection through observation, and is written descriptively to describe more detailed results. The results showed that the spatial system and existing layout were still not suitable, especially in terms of space hierarchy, and in terms of space facilities, so it needed adjustments to make spatial arrangements that could facilitate the needs of residents.

1. Introduction

In Indonesian UUD of the 1945 Constitution, it is said that every person has the right to live physically and mentally, and has a good and healthy place to live and a living environment. However, in reality the problem of settlements is still a problem that often occurs, including the city of Jakarta. In the last few years, the problem of slums is gradually being handled. Limited land, a large population and a large number of people from low economic circles, made the government initiate a solution, namely the construction of lower class vertical housing ('Rusunawa').

According to Basuki Tjahaja Purnama [1], he targeted in 2017 the number of families to be moved by 20,000, so that more than 20,000 flat units are currently being built. Residents who will be relocated are prioritized on the banks of rivers and green lanes, and each family will be given a flat unit to be occupied. When designing a dwelling, keep in mind that a home is the expression of the occupant group. The essence of home in human life is as a center of realization of life, so a dwelling must be able to accommodate the needs of its inhabitants [2]. However, many residents who live in flat housing complain that the available sleeping space too cramped, the kitchen is minimal, and there is no private bathroom available [3]. Residents feel that the flat provided could not accommodate their activities and needs so they are not comfortable to live in. 'Rusunawa' construction is massively related to the position of the architect, because it is important to provide a means of living by first

seeing the aspects of humans who will live in it. Space and structuring needs need to be regulated in such a way as to accommodate the activities and needs of its inhabitants, not just the 'minimal' occupancy.

2. Material and Method

Spatial means that space is not always clearly defined, but is a place where there is activity in it. Spatial can be related to many contexts, but spatial is not only related to outside environment, but also related to interior space [4]. When arranging housing, appropriate spatial arrangement is needed, namely with a spatial system and appropriate furniture layout. The standard of spatial system and layout of furniture for housing are as follows:

Table 1. Theory of Spatial System and Furniture Layout

No	Factors	Theory
1	Spatial Hierarchy	A house must have spatial hierarchy in the following order [5]: a. The Outdoor Room which is the outer zone of a house. b. Family Community is a place of presence of outsiders inside a residence. c. A Family Hearth is a space where family members can gather together. d. Service Core which is a service place within the house. e. A Room of One's Own. Parts that are places for individuals who can be personalized according to their desires, interests and nature.
2	Spatial relationships	The relationship between spaces in a residential house needs to be regulated as follows: a. Space is interrelated: dining room and living area [6]; Kitchen and dining area [7]. b. Adjacent space: child's room and parent's room [7]; Bedroom/closet adjacent to the bathroom/toilet [6]. c. Space that is connected to a shared area: Child's room and parent's room need to be connected with a space that can be used for socializing [7].
3	Spatial Organization	The cluster organization is suitable for use in residential areas with a small area because it can be a solution when you want to create an informal space where this organization will create a more relaxed and comfortable atmosphere and not rigid [8]. Open plan space organization is also more suitable for use in small size residences than closed plan because it will create a spacious impression [9].
4	Spatial Orientation	Space orientation should be as follows [10]: a. Kitchen: overlooking the patio/garden/playground. b. Dining room: overlooking open area. c. Bedroom: overlooking open area. d. Bathroom: facing the open area. e. Living room: overlooking the entrance of the house.
5	Space Requirements	In flats, residential areas must have a multipurpose room (functioning for cooking and living areas that are integrated; service areas for washing, bathing and drying, and private areas for resting in the form of bedrooms [11].
6	Room Facilities	The occupancy of 4 simple families in Indonesian standards has the following room facilities [12]: a. Living room: guest table, seating for 6 people. b. Dining area: 4 dining chairs, 1 dining table and cabinet for dish rack. c. Main bedroom: bed for rest, cupboards and shelves. d. Child bedroom for 2 people: 1 bunk bed, 2 study tables, 2 chairs and 1 wardrobe. e. Bathroom: squat toilet and bathtub.
7	Ergonomics	For housing, ergonomics standards include the following: a. The minimum seat depth is 39 cm [13]. b. A dining table measuring 122x76 cm [6]. c. The kitchen has a minimum counter of 45.7 for the work area [13]. d. The master bedroom has a minimum bed of 121.9 cm for 2 people [13]. e. The child's bedroom has a minimum bed of 91.4 cm wide [13].
8	Circulation	In the circulation channel occupancy must be regulated for activity efficiency, including [6]: a. The kitchen must have sequential grooves from material storage, preparation area,

washing area and stove area.
b. Bedroom: storage cabinet close to the room entrance.
c. Bathroom: the water container with toilet must be side by side.
d. The minimum width for overall circulation is 61 cm.

The case of this approach is summarized in a research interpretation framework to evaluate the study case, which is made in the chart as follows:

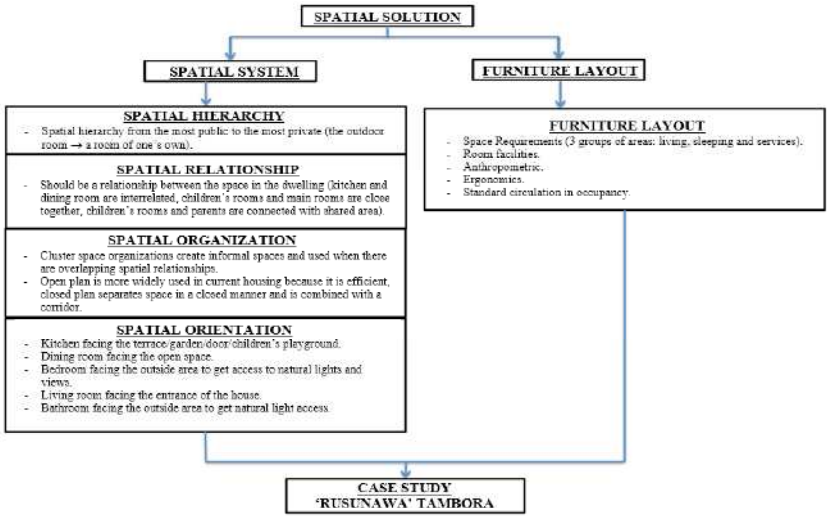


Figure 1. Research Interpretation Framework

This study took a case study in 'Rusunawa' Tambora, West Jakarta, Indonesia. Observations will be carried out intensively in three sample units with four residents (Father, Mother and 2 school-age children) to find out the activities of each apartment occupant. Standards from literature and observations of occupant activities will be used as guidelines in arranging spatial units, so that the resulting arrangement is in accordance with standards and can meet the activities of its inhabitants.

3. Results and Discussion

To find the right spatial solution in 'Rusunawa' Tambora, an analysis of the deficiencies and non-conformities of the existing spatial system is needed and the right solution, as summarized in the following Table 2:

Table 2. Existing Conditions and Solution of 'Rusunawa' Tambora Spatial System Spatial

Num	Factors	Existing Condition	Solution
1	Spatial Hierarchy		

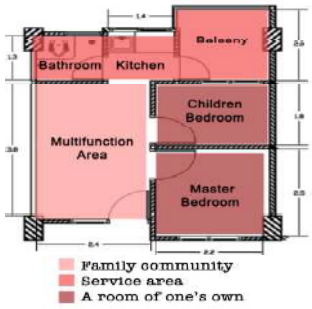


Figure 2. Hierarchy of Existing Space of 'Rusunawa' Tambora.

A room of one's own is a bedroom, consisting of child privacy and adult privacy. There is already a separation between children privacy and adult privacy, but the hierarchy is still not seen because the most private rooms are easily accessible from multipurpose/living area, and close to the entrance.

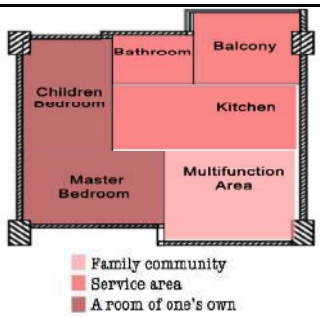
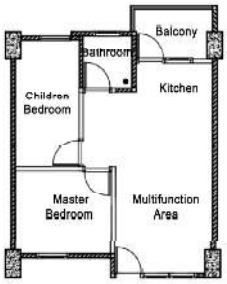
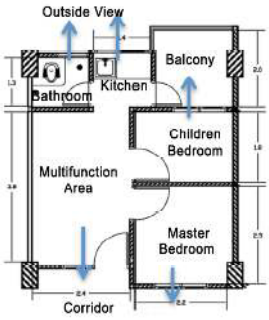
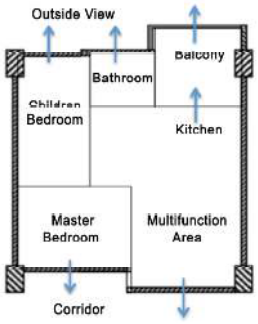


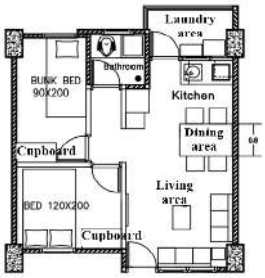
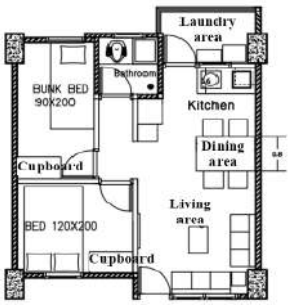
Figure 3. Hierarchical Space Analysis of 'Rusunawa' Tambora.

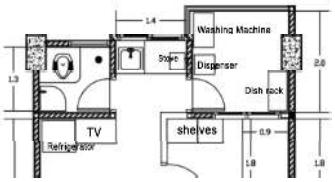
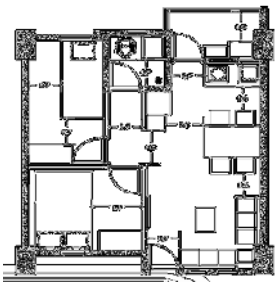
To make the occupancy have a hierarchy of space, the placement of children's bedroom and main bedroom are placed deeper, so that they are not close

Num	Factors	Existing Condition	Solution
			to the entrance, and cannot be directly accessed from the living area.
2	Spatial Relationships	 **Figure 4.** Existing Spatial Relationship of 'Rusunawa' Tambora The toilet located on the back side, right after the multipurpose room, so that it is easily accessible for guests, but the bathroom which is attached to the toilet is quite far from the main bedroom and children's bedroom, so it will be difficult to reach.	 **Figure 5.** Spatial Relationship Analysis of 'Rusunawa' Tambora. Bathrooms and toilets needs to be made adjacent to the bedroom.
3	Spatial Organization	 **Figure 6.** Existing Spatial Organization of 'Rusunawa' Tambora. Space organizations use open plan and cluster, so it is already suitable for small housing.	 **Figure 7.** Spatial Organization Analysis of 'Rusunawa' Tambora. Open plan and cluster organization are the most suitable options.
4	Spatial Orientation	 **Figure 8.** Existing Spatial Orientation of 'Rusunawa' Tambora. The orientation of the space in the flats unit is suitable, but the dining area in the multipurpose room does not get natural lights.	 **Figure 9.** Spatial Orientation Analysis of 'Rusunawa' Tambora. The dining area need to be placed between the living area and the kitchen so the dining area will face the open area.

Furniture and space are interrelated in arranging good housing, so layout also needs to be observed. The arrangement of the existing furniture layout in 'Rusunawa' Tambora needs to be analysed for deficiencies and non-conformities to determine the right solution, as in the following Table 3:

Table 3. Existing Condition and Solution of 'Rusunawa' Tambora Furniture Layout

Num.	Factors	Existing Condition	Solution
1	Space Requirements	 **Figure 10.** Available Space of 'Rusunawa' Tambora. The available spaces are in accordance with the apartment standard.	 **Figure 11.** Space Requirements analysis of 'Rusunawa' Tambora. Available spaces are maintained to accommodate occupant activity properly.
2	Room Facilities	a. Child bedroom facilities at three sampling units are not equipped with study desks. b. The bathroom is not equipped with water containers. c. There are no dining tables and chairs for all units due to lack of area. d. The living rooms are not equipped with seating for a capacity of six people.	 **Figure 12.** Analysis of Room Facilities of 'Rusunawa' Tambora. Space facilities need adjustments, such as the need for additional dining tables and chairs, seating capacity of 6 people, bathtubs. But in a child's bedroom, a study desk is not needed because residents are used to using communal library facilities for learning.
3	Anthropometrics & Ergonomics	Ergonomics in each unit still not suitable, especially for beds that are not in accordance with the standards so that residents who do not get space on the bed sleep on mats.	 **Figure 13.** Ergonomic Analysis of 'Rusunawa' Tambora. In the main bedroom, the bed should be 120x200 cm, and for children's bedroom using bunk beds with a mattress size of 90x200 cm each. The

Num.	Factors	Existing Condition	Solution
			dining area needs to be added 80x120 dining table with a capacity of 4 people.
4	Circulation	The width of the circulation area in the units are quite good because there is not much furniture that fills the flat units, but the flow of circulation in the kitchens are not suitable because there is not enough space available for the refrigerator, dispensers and shelves. Those appliances placed in other areas, which led to make the circulation flow for cooking not suitable. Water tub doesn't locate beside the squat toilet.  **Figure 14.** Furniture Layout in One Sampling Unit.	 **Figure 15.** Circulation Analysis of 'Rusunawa' Tambora. To facilitate cooking activity, it is necessary to arrange accordingly starting from the storage (refrigerator), which is continued adjacent to the washing and cooking area. To make the flow better in the bathroom, water tub located beside the squat toilet, make it easier to reach.

Based on the results of the above research, it can be concluded that in order to design a suitable spatial arrangement of 'Rusunawa' Tambora, it is necessary to adjust the spatial system and furniture layout, such as:

a. The space hierarchy adjusted from the most public to the private area so that the bedroom will not be directly accessible from the entrance, because the privacy of the room will be disrupted if the space hierarchy is not suitable.
b. The relationship between the bathroom and bedroom need to be close together.
c. Space organizations will still use clusters and open plans.
d. The orientation of the dining room is made facing the balcony to get natural light, while the orientation of the other room is maintained.
e. Space requirements that have been fulfilled in the current plan are maintained in order to meet the needs.
f. Space facilities are provided in accordance with the activities of residents to meet needs. The kitchen area should be provided with facilities such as a refrigerators and dispensers needed by residents, and the addition of a water container in the bathroom. Some residents do not do a lot of activities that require chairs, so that space facilities can be replaced using carpet.
g. Anthropometry & ergonomics need to be considered to achieve suitable sizes especially in the bedroom where the mattress must be able to contain all occupants.
h. Circulations need to be adjusted with minimum width of 61 cm and the circulation flow of each space need to be considered.

4. Conclusion

Based on the results of the study, it can be concluded that although the available area already meets the minimum area for 4 residents, the occupants still feel that their activities have not been fulfilled in the shelter, so it needs appropriate spatial arrangement to accommodate residents' needs and activities. Spatial arrangement suitable for 'Rusunawa' Tambora is as follows:

a. The children and master bedroom placed on the side which is not visible directly from the entrance and living area.
b. The kitchen area need to be expanded to fit a dining table, refrigerator and dispenser.
c. The bathroom area needs to be provided with water container facilities.
d. The master and children bedroom are adjusted so the rooms can fit a wardrobe and beds according to the standard size for four residents to use.

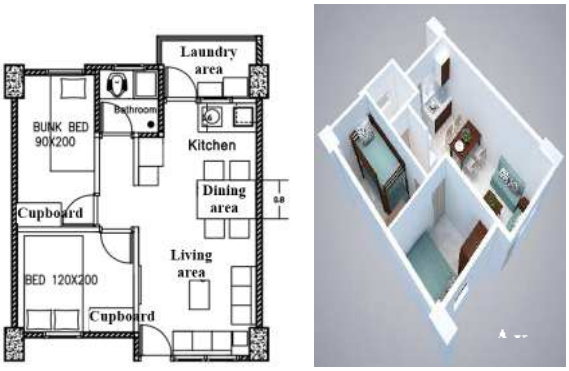


Figure 16. Spatial Solution for 'Rusunawa' Tambora.

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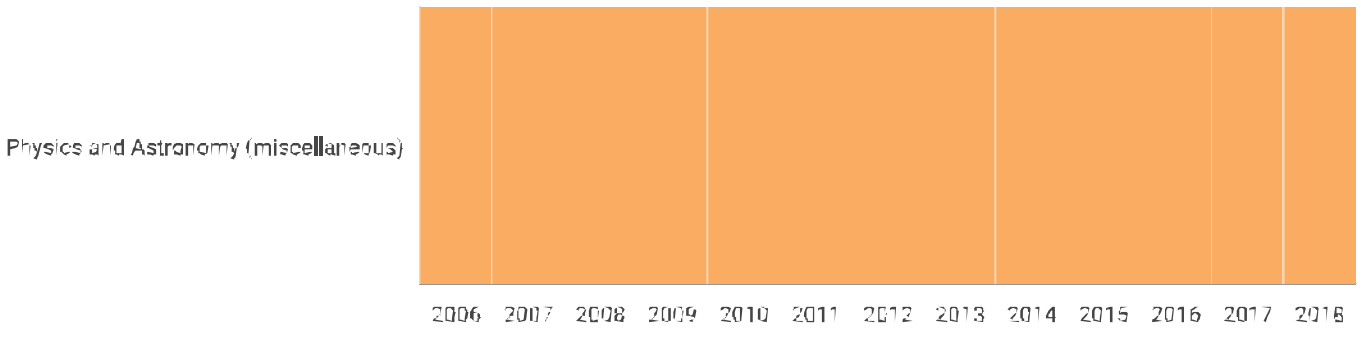

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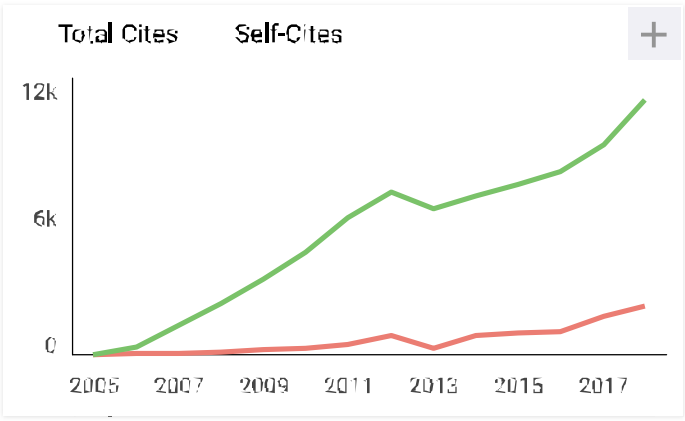

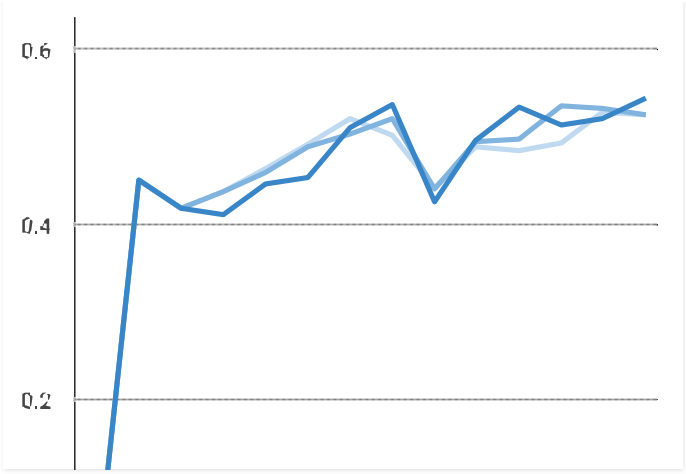

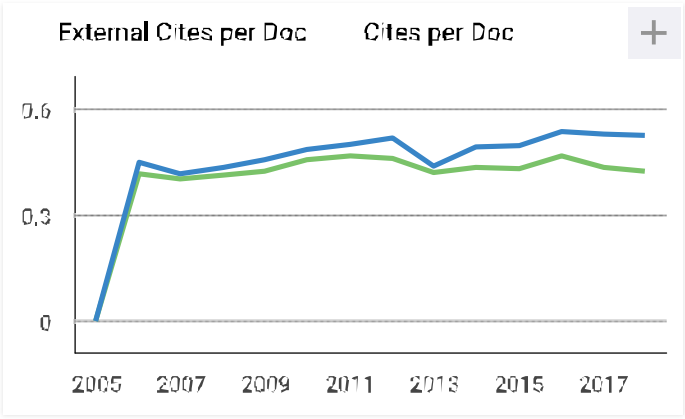

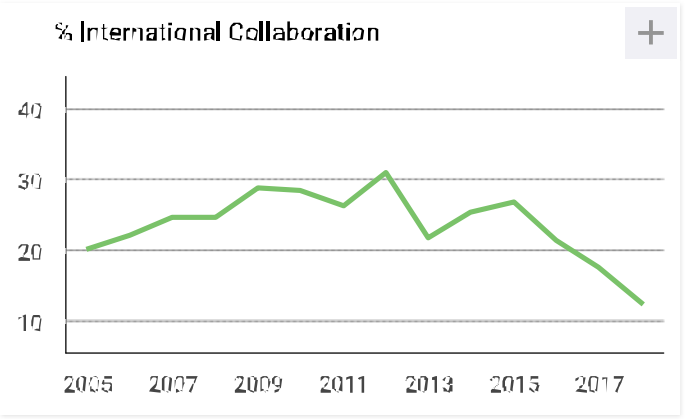

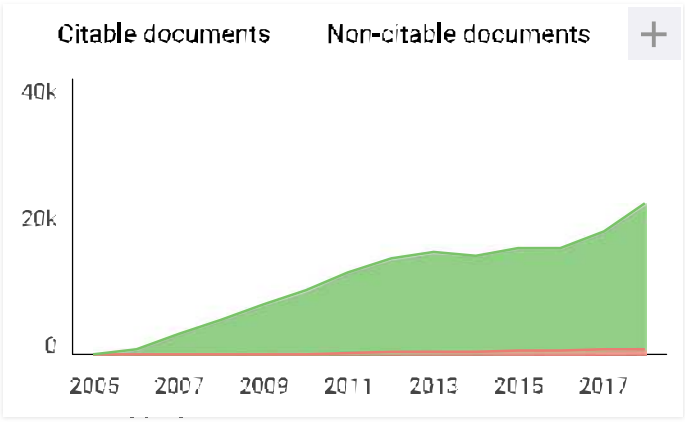

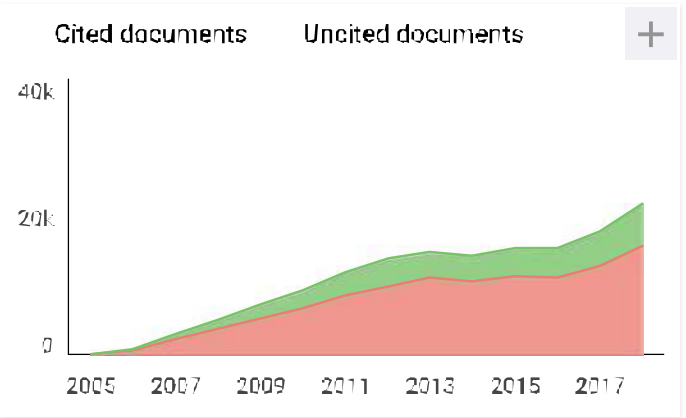

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