

## Analysis bibliometrics driving distraction

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### Abstract

The driving process is a very complex activity like awareness, retrieval decision, and execution. Introduction Circumstances distracting the driver are significant for ensuring the driver's safety. Therefore, research This study trends article about distracted driving. Data from the Scopus database is collected, published between 2013 and December 2022, and processed using Vosviewer. The combination of words used to find an article related to distracted driving is "driving distraction" and "behavior." Studying this endeavor answers the formulation problem: " What just trend main, topics key, and the sources that contributed most in the research domain? How development study scientific related distraction driving, especially in context security Then cross section and the factors that influence it, are reflected in literature scientific?". The result of the study This is as follows: Disruption trends driving from year to year experience enhancement so that matter the show that study regarding "Driving Distraction" and "Behavior" are still exciting For researched more further, factors the resulting distraction in study various things, including factor internal and external distraction. Internal factors are existing factors \_ from self-drivers and external factors like the use of the telephone, side billboards road, navigation while driving, and listening to music at the moment driving.

**Keywords:** Driving distraction; Distraction; Bibliometrik; VOSViewer; Driving Simulator

### 1. Introduction

The Global Status Report on Road Safety by the World Health Organization reports that every day, more than 3500 people die in accidents. The worldwide traffic added up to 1.35 million deaths per year and 50 million additional injured and disabled [1]. The driving process is a very complex activity like awareness, retrieval decision, and execution. So, no one can deny that such abnormal situations error distraction will, in a way, directly cause risk driving [2]. A survey based on 1,367 drivers found that traffic caused by interference \_ driving causes 14 to 33 percent of accidents [2].

In research, driving distraction is defined as the transition from attention task main to task secondary [2, 3, 4, 5]. That thing is influenced by factors like gender, age, experience driving, and background behind culture [1, 6]. Distraction moment driving among them is visual and cognitive disorders. Visual distractions are every time you look at the driver going out from task main (redirect view from road). Cognitive every time attention is withdrawn from driving For set it to tasks secondary ( divert thought from driving ) [6]. Distraction can happen simultaneously or each. \_ Therefore \_ that is an introduction circumstances distraction the driver is significant for ensure safety driver, passenger, rider bicycles and property. At the moment, driver distraction involves the distribution of attention between task primary (driving) and secondary tasks unrelated to driving. Secondary driving tasks can be performed inside the vehicle, such as conversing. Mobile phone, infotainment interaction inside a vehicle, Etc. ) or externally ( e.g., reading sign advertisement edge walk, look element the landscape is not related, etc. ) [7].

The American Automobile Association Traffic Safety Foundation defines distraction driving as attention driver No focused on the task driving Because events, activities, objects, or people within or outside \_ the car result in declined

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ability reactive driving [2]. To identify distracted driving, experts in the field have done lots of research that summarizes aspects of distracted driving, for example, the effect of telephone interference on the driver [3] effect of distracted driving the telephone increases the standard deviation position path (SDLP) regularly significant, aside That research conducted by [ 6 ] identified perception driver and effects from telephone interference as well age to speed, shows results that use a cell phone and age own significant influence on speed and influence \_ telephone interference assessed taller to speed compared to with factor age.

Brome et al. (2021) test distraction driving with board advertisement animated, static, or transition using a *driving simulator* results in distraction advertising animation nor transition more influence performance driver compared to board advertisement static. A study in line with the results of research conducted by Meuleners et al. (2020) shows that impactful digital *billboards* are bad for performance driving on size speed, position pathways, and digital *billboards* can influence the visual fixation of the driver and can result in an accident then cross. There are many reliable tools \_ For identifying distractions to the driver. Evaluation visually with \_ *eye-tracking* that sees the amount of fixation on the moment driver distraction [5, 10], then on assessment distraction cognitive driver can be identified with the use of *electroencephalography* (EEG) for evaluate responsiveness driver at the time experience distraction the [11, 8, 12] For more details in table 5.

Study This uses method *co-occurrence network analysis* and methods analysis measurement to analyze a systematic connection between studies driving distraction. Analysis bibliometrics done in five aspects: distribution literature quantitative annual, source publication primary, productive and influential countries/regions, organizations productive and influential, researcher productive and influential. Study This aims to give a reference for future research \_ about distraction driving through the bibliography and *co-occurrence network*. To achieve the objectives of this research \_ This formulation is a must problem including: " What just trend main, topics key, and the sources that contributed most in the research domain this? How development study scientific related distraction driving, especially in context security Then cross section and the factors that influence it, are reflected in literature scientific?"

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## 2. Materials and methods

### 2.1. Material

#### 2.1.1. Driving Distraction

Driving distraction is activity secondary (e.g., playing on the phone, looking at board advertising ) that confiscates attention to the moment driving to influence activity essence and cause accidents. Distraction driving refers to a phenomenon in attention directed at activities not related to normal driving, which results in a decline in the ability to drive [4]; disruption driving is defined as a diversion from an activity essential to an activity secondary ones do not relate [5], Disruption driving is at the moment attention driver shifted from task main driver ( driving ) to think about other things [2], attention that is not annoyingly relevant \_ so that influence behavior driving [11] Distraction driver defined as a situation where the activity not related with driving compete For get attention driver [13].

#### 2.1.2. Bibliometric

Bibliometrics is a method systematically used to analyze journals, scientific and other written publications digitally (digital) Harande, (2001) (Royani & Idhani, 2018). Analysis bibliometrics done in five aspects: distribution literature quantitative annual, source publication main, productive and influential countries/regions, organizations productive and influential, researcher productive and influential. Overall, the article aims to give a reference for future research about direct distraction through network bibliography. This paper to reach four objectives : (1) evaluate the trend study system moment about distraction driving ; (2) show the keywords, country, and cooperation academic between different authors and clusters ; (3) identify and sort existing literature \_ about method introduction distraction driving, incl factors and methods introduction. Through solution objective research, then can reach an understanding \_ of comprehensive breadth and depth all over field study distraction driving and owning more understanding \_ of a problem most important in the field. Bibliographic data will be used to identify the connection between the article and the authors. This study uses a database from Scopus, which accommodates documents from all science disciplines.

### 2.2. Methodology

#### 2.2.1. Search Strategy

The first thing to do in systematically compiling review references is to determine the criteria search in a way right in

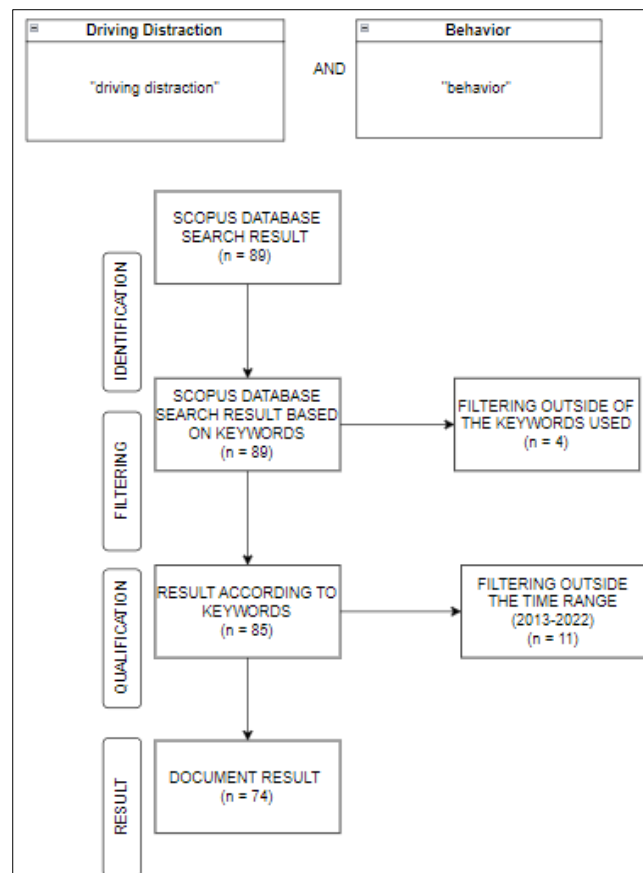
the database. The database used in the study is Scopus. Search done in March 2023—results from the Scopus database used range from 2013 to 2022—search details in figure 1.

### 2.2.2. Criteria Filtering

The search started with the keywords "driving distraction" and "behavior" to get results focusing on driving distraction against visual and cognitive distractions in behavior drive. The keywords resulted in 89 articles. Documents used must fulfill provision among them, the subject study must be driver, and there must be empirical data on the test distraction driving. From filtering the suitability study, we obtained 74 relevant articles based on year publishing, focus method used in identification disorders, influencing factors of distraction driving, and attribute respondents (size sample, age, experience).

## 3. Results and discussion

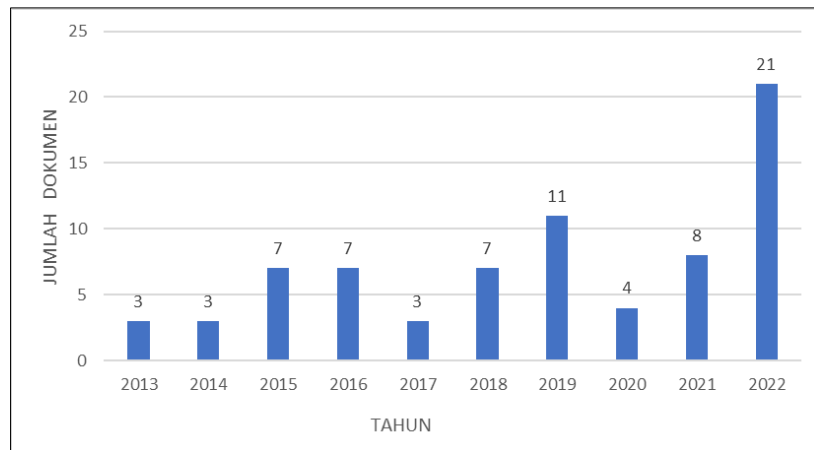
### 3.1. Overview of Article Development Trends



**Figure 1** Article Selection Process Diagram

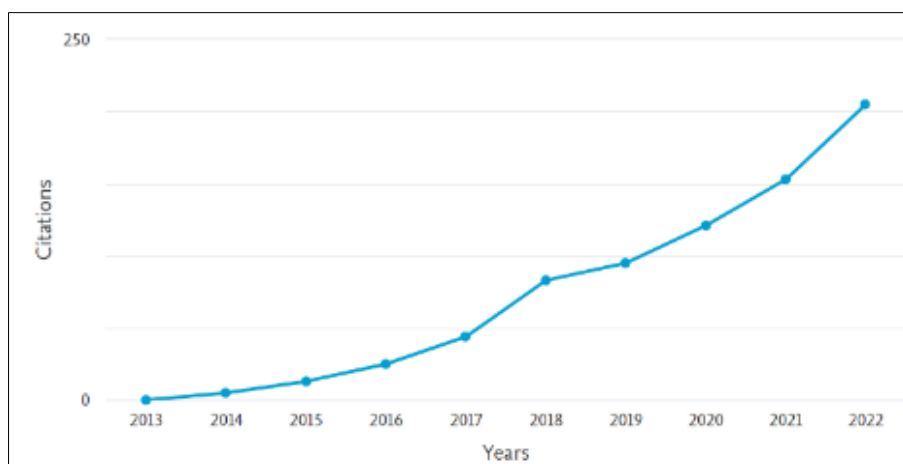
Based on a search from Scopus with the keywords "Driving distraction" and "Behavior," there were 89 documents. Then, check the period time document in the year "2013 – 2022" after reviewing the obtained documents as many as 78 and filtering again on keywords that do not in accordance amounting to 4 documents obtained results documents used For studied amounting to 74 documents. Figure 1 shows the selection process articles used. Study about distraction driving in time to time experience increase. In 2019, it experienced a four-time increase from 2017 and 50% in 2018. Then, 2022 has the highest amounting to 21 documents.

Figure 2 shows articles about distracted driving and behavior published every year (2013 – 2022). Studies regarding these keywords increase from time to time experience increase. In 2019, it experienced a 4-fold increase from 2017 and 50% in 2018. Then, 2022 has the highest chart, as big as 21 documents. That shows that studies regarding "Driving Distraction" and "Behavior" are still fascinating for further research. That shows that studies regarding "Driving Distraction" and "Behavior" are still fascinating. For more research, continue.



**Figure 2** Research trends topic driving distraction from 2013 to 2022

The keyword citations in the resulting document\_ every year always experience quite an improvement, as seen in Figure 3. Figure 3 shows that trend study about distracted driving Still becomes a topic that can be researched.



**Figure 3** Quote 2013-2022

### 3.2. Study Contribution

There is a total of 74 documents published from 25 contributing countries. Table 1 shows the contributing countries in the "driving distraction" "behavior" study; data shows that writers from China dominate research in the field. So, with a total of as much as 41% of the total documents, followed by the United States with 26% of total documents, Australia with 5% of total documents, other countries also follow suit However with more amount \_ A little from these three countries. Document from these three countries accounted for 72% of the total articles, which shows that research in the field is balanced with the number of regions in the world.

**Table 1** Distribution of Studies by Country

Country	Amount Documents ( n=74)
China	30 (41%)
United States	19 (26%)
Australia	4 (5%)
Malaysia	3 (4%)
United Kingdom	3 (4%)

Country	Amount Documents ( n=74)
Canada	2 (3%)
Italy	2 (3%)
Taiwan	2 (3%)
Other Countries: Austria, Bahrain, Ethiopia, Finland, France, Greece, India, Indonesia, Israel, Japan, Lebanon, Mexico, Romania, Russian Federation, Saudi Arabia, South Korea, Spain	17 (17%)

Source: Scopus

**Table 2** Quote Document

Country	Document	Quote
China	30	120
United States	19	151
Australia	4	271
United Kingdom	3	114
Canada	2	1
Italy	2	7

Source: Scopus

Table 2. shows results that China contributed the most, with a total of 30 documents that have been cited 120 times. Then, the United States came second with 19 documents and quoted 151 times, Australia with 4 documents but most quoted 271 times, and the United Kingdom with amount document 3 and cited 114 times. Data processing with VOS (Visualization of Similarities) Viewers has opened the door to more understanding of diverse contributions from the writers in various research. Under discussion, we will explore the importance of tools. This describes the role of every writer in forming a framework for more research complete and varied, which, in the end, can give more decadent and more relevant insights into various disciplines of science.

**Table 3** Study Contribution-Based Authors

Author	Document	Quote
Read gjm	2	94
Salmon pm	2	94
ma y.	3	46
fur r.	3	45
Zhang y.	2	22
kong x.	2	18
Shi y.	2	10
Zhou r.	2	10
mom c.	2	6

Source: VOSViewer data processing

In Table 3, you can see that based on data from Scopus, with a total of 74 documents, ten authors were found to have amount quote Lots as in table 3. Author Read GJM (2 documents ) with a total of 94 citations, Salmon PM (2 documents ) with a total of 94 citations, and Ma Y. (3 documents ) with an amount quote 46. Total quotes most reflect the extent of the work or study somebody has contributed in the environment, scientific or academic, and how relevant and impactful

work is to do more research and thinking \_ broadly in the field. In many cases, a quote can be used as an indicator of the popularity, influence, and contribution of a writer to something field research.

### 3.3. Keyword Co-occurrence Analysis

Keywords \_ is a phrase or words used as keys To connect at a field. Through keyword analysis \_ we can quickly understand developments and research hot spots moment this is somewhere field and deepen our understanding of this. The network between keywords resulted in 796 keywords and 70 thresholds (see Figure 4), with a minimum document count of 4. As a result of the visualization in Figure 4, *driving distraction* becomes a frequent event \_ happened. In the visualization, the word " *Driving Distraction*" is the largest. The node size is appropriate for several posts, and line thickness indicates how near the author Works. Color blocks with the same color show similarities between \_ them— networking between keys based on keywords author, with a minimum of 2 documents. Get results from 796 keywords in Figure 4.

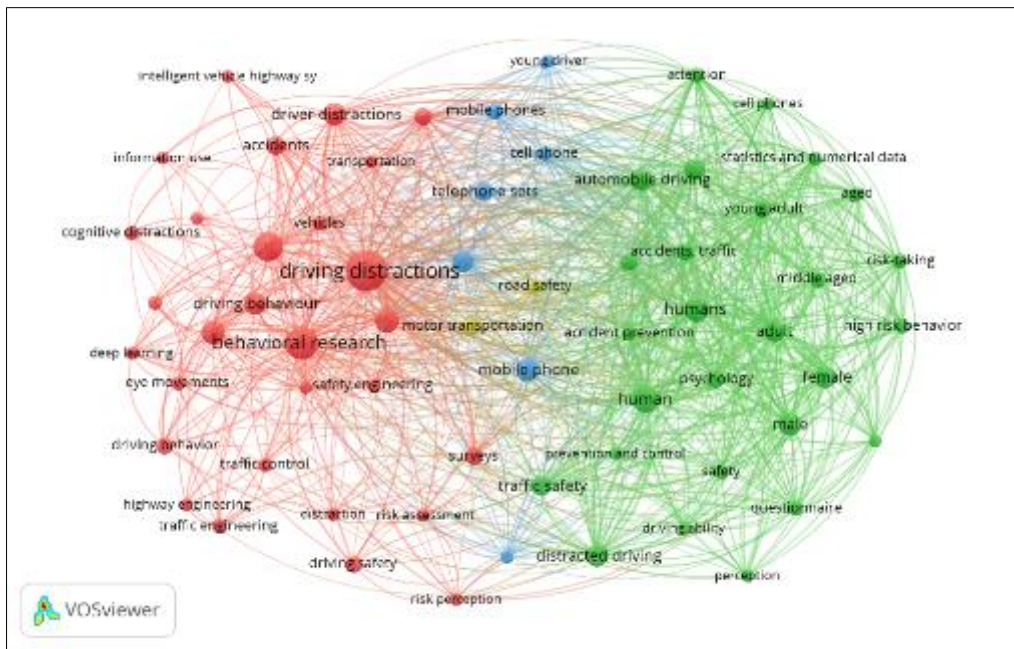


Figure 4 Keyword Co-Occurrence

Table 4 Top 10 Co-occurrence kata kunci

Kata Kunci	Occurrences	Total Link Strength
Driving distractions	42	281
Behavioral	26	158
Driving distraction	21	126
human	18	250
Humans	15	228
Road and street	14	120
adult	13	204
female	12	185
male	12	185
Mobile phones	12	122

Source: VOSViewer data processing

Networking between a key shows that with keywords, the author of “*driving distraction*” has the largest *node* has the most frequent occurrence. “Driving distraction” has the same group as “driving behavior” has close distance, that is own close relationship. Figure 4 shows 3 groups based on color. Group 1 is colored red and discusses related events with driving distractions such as accidents, traffic control, traffic, vehicles, Etc. Group 2 is colored blue and contains keywords type distraction driving such as telephone sets, cell phones, and mobile phones. Group 3 is colored green and contains keywords such as attention, a group based on age and type of sex driver. Based on Table 4, the top 10 keywords have the greatest co-occurrence and total link strength. Keywords driving distractions become order number 1 with an occurrence 42 and a total link strength of 421.

### 3.4. Distraction Factor Analysis Driving

Analysis influencing factors distraction driving become base study about method introduction distraction driving. Therefore it is necessary to analyze the influencing factors of distracted driving. Following This are some journals produced by Scopus data that discuss distraction driving. Table 5 summarizes the influence of these factors, methods, and results on distraction affecting driving behavior driver based on the results of the *literature review*, especially in type research articles that use *driving simulators*. Table 6 shows a study done on introduction distraction just driving done from a driving simulator test, with various method measurements used To identify interference.

Influencing factors distraction in the study, among them are internal and external distractions from the driver. Driver's internal distractions like attitude driver in drive [1], age [6], *working memory* [5], later distraction external driving among them is distraction *billboards* [9, 14][8], 8, 12], both static and digital as well design, location *billboards*, telephone use such as receive telephone, send message text nor sound at the moment driving [3, 10], listen music [15], as well use navigation at the moment driving [16]. Distraction driving the assessed can influence behavior like speed vehicle, acceleration, position route, and violations committed.

**Table 5** Literature Distraction Driving

Author(s)	Factor	Measurement method	Results
[3]	Telephone use at the time of driving	<i>Lateral Control Measure, Longitudinal control measure</i>	Distraction can increase the Standard deviation position lane (SDLP) basis significant.
[5]	Working memory capacity (WMC) and eye tracking data	<i>N-back '2-back' task, fNIRS, and eye tracking</i>	Task double capable add burden cognitive and change behavior view
[15]	Cognitive load on groups age.	EEG, Analysis statistics : ANOVA	Error braking increases in more groups old at the moment happens interference.
[9]	Influence board behavioral advertising driving	<i>Eye tracking, behavior</i>	Digital signage impacts performance driving, size average speed, variability speed, variability position lane, and visual fixation.
[14]	Type annoying <i>billboard</i> behavior driver	Behavior driver, statistical analysis (ANOVA)	Billboard graphics are the fewest ads that affect the distraction to the driver.
[8]	Influence of advertising type on performance and attention driver	Driver performance, <i>eye tracking</i> , Statistical analysis (ANOVA)	Various types of digital advertising (DBA) affect performance drivers and allocation attention.
[12]	Distraction cognitive on task double driving	<i>EEG-based distraction detection</i>	Voltage Further increases over time; there is a distraction and doing task secondary.
[1]	Attitude abnormality driver at the time driving	Questionnaire DBQ ( Pre and Post-test) analysis (ANOVA)	Entire respondents exceed the speed limit, and gender influences speed drive

[10]	Types of interference telephone use with sending message text and voice	<i>Eye tracking</i> , behavior driver	message voice moment driving was found to be more bothering than calling and led to levels similar to visual and cognitive impairments with SMS.
[16]	Use of software (maps) at the time driving to a driver with age and experience different	NASATLX Questionnaire analysis (ANOVA)	Influence Age and experienced drive show that distraction will be more easily handled by young and experienced high.
[6]	Effect perception driver, distraction, and age to behavior drive	analysis (ANOVA)	Using cell phones and age has a significant influence on speed. _ Influence distraction more tall than age to speed.

**Table 6** Summary Distraction Driving

Author(s)	Type Distraction					Detection Distraction				Behavior				
	Internal	External				Cognitive	EEG	eye tracking	fNIRS	Questionnaire	Speed	Position track	Reaction time	Error
		Telephone	Billboard	Navigation	Music									
[3]		√									√			
[5]					√		√						√	
[15]	√		√		√							√	√	
[9]			√				√			√	√			
[14]			√								√			
[8]			√			√	√							
[12]					√	√								
[1]	√								√	√				
[10]		√						√			√	√	√	
[16]	√			√						√	√	√	√	
[6]	√	√								√				

From analysis, tables 5 and 6 show that interference driving can happen Good in a way intentional with the use of the telephone for sending messages, text or voice, speaking through calls, and navigating. Apart from distractions, other factors can influence drivers. So, distraction can influence performance, age, behavior driving, perception driving, and experience driving. Methods used to identify distractions that occur among *eye tracking* [9] - [10], for identifying change in vision and lack of focus eye to path due \_ to visual distraction, EEG and fNIRS are used For identify condition driver, performance brain to interruption at the moment caught distraction driving, and detection in a way subjective use questionnaire post driving For evaluate distraction to the driver.

Selected research \_ covers many steps for evaluating distracted driving. The evaluation performance of the driver depends on the results from a driving simulator. The consequence of perceived distraction \_ driver can seen from the average speed of the driver at the time caught interference; whether the speed is different at times, no, there is interference. The driver was hit by distraction, which impacted performance in one of the speed vehicles and exceeded the established limit specified; position path and time reactions also became indications of distraction to the driver.



That is because drivers are not focused and inclined to divert their view and attention to tasks; secondary ones do not relate to task driving.

The studies selected varied widely in some aspects, like proposed goals, the participants, results, and so on. However, there is a similarity from the results of the main study about distraction driving, like talking and texting on a cell phone, which causes enhanced standard deviation position line (SDLP); SMS directly significantly improves SDLP, temporarily task speak shows more lateral variations A little compared to with No There is distraction [3] and order voice moment driving found more bother than call and lead to level similar visual and cognitive impairments with SMS [10] Apart from telephone use, factors age is also one of them influencing factors \_ performance [6], [15] which impacts the position lane, speed, time reaction in braking as well as error at the time driving. Drivers know the danger of telephone use while driving; however, they still do it [1].

Another activity secondary impact negative performance driver is the driver who uses its navigation on the phone because interface design (UI) on the application can add visual and cognitive demands to the driver at the time of activity [16]. However, the No is too dangerous, like sending a message. Influence, age, and experience are \_ necessary factors \_ to consider; like driving, young people get used to it. For navigation at the moment when driving, as well as allocating attention, they can overcome distraction compared to the driver old. The external environment can have a negative impact on performance drivers, among them the use of billboards. Using billboards can cause drivers to divert their view from the road and improve the burden of mental work. Various kinds of billboards on the road \_ can influence performance drivers; digital billboards have a negative impact on performance drivers on size speed, position lane, and visual fixation when compared with static billboards [14]. Animated billboards assessed more influence than transition billboards Because of the influence allocation attention driver [8]. Graphic billboard without a picture is the fewest billboards that affect driver [14].

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#### 4. Conclusion

Focus on the main study. This study summarizes the trend of distracted driving, as well as factors reason distracted driving. Disruption trends drive from year to year experience enhancement, so studies regarding "Driving Distraction" and "Behavior" are still fascinating for future research. The most frequent keywords \_ used are distraction driving with total strength network 281, behavior, types of sex drivers, and telephone use, becoming frequent topics \_ used in research. Source contribution the three most significant studies from China with 30 documents. Furthermore, 58.1% of the research produced was in the form of article scientific.

The resulting distraction factors in the study of various things, including factor internal and external distractions. Internal factors such as age, experience driving, and attitude drive in driving. External factors like telephone use, side *billboards* road, navigation while driving, and listening to music at the moment drive. Distraction happens because driver No can allocate attention, so that attention switches to secondary tasks and does not focus his gaze on the road.

Studies show that distraction driving and behavior driving are exciting research topics because Lots of capable factors \_are discussed more. The study can identify more of 2 factors of distraction driving, like merger use of the telephone for navigation and interference external with board advertisement with several groups of different ages \_ To see differences that occur in groups. The development of technology like telephone navigation and current digital advertising drives that. This Already become a matter existing generally \_ on the road kingdom—however, there is a need to review more carry-on to know the impact on the driver If done.

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#### Compliance with ethical standards

##### *Disclosure of Conflict of interest*

No conflict of interest is to be disclosed.

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