

## The future of everyday walking

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### **Abstract**

In most countries - The Netherlands is no exception - policy regarding walking is focussed on solving urgent problems. A problem becomes urgent when it affects citizens in such a way that they ask the authorities to take action. Serious accidents have the same effect. In most cases these problems are very specific and localised. Consequently, apart from implicit policy and development planning activities, policy measures regarding pedestrian issues are predominantly demand driven and concentrated on safety issues. Citizens generally do not ask for a holistic or systems approach.

In the 90-s the pro-active Sustainable Road Safety vision was introduced (Koornstra e.a., 1992). Current Policy makers realise that a systems approach has the best potentials for lasting results. As a first step the road system was re-classified and more than half of the urban area is now 'traffic calmed'. Pedestrians and cyclists benefit from these structural interventions.

Up till now the pro-active approach was essentially concentrated on current needs. Recently a more dynamic view is taken. For this insight in the future is necessary. This paper deals with a first attempt to acquire such insight regarding everyday walking. As a conceptual model / checklist the so called Pizza-model (Methorst, 2003) was used.

Conclusions are:

- The importance of everyday door-to-door walking will decrease, mainly because the number of desirable destinations within walking distance will drop. This will partly be compensated by multi-modal walking. Thus the amount of time spent as a pedestrian will probably not decrease much.
- For the majority of the population a diminishing quality of pedestrian facilities is not an important issue, since they do not really need high quality facilities and they have ample alternatives. On the other hand, walking will become more difficult and more risky for a growing part of the population: people with limited mobility and those that cannot fall back on car use. Their quality of life is at stake.
- Awareness of the problem is crucial. At the moment politicians and policy makers do not get a fair representation of the importance of walking. As yet the growing importance of multi-modal walking is invisible; foreseeable problems and the (evident) benefits of walking are not systematically documented. Therefore politicians and policy makers can have no idea that there may be an upcoming pedestrian problem; as yet there is no compelling reason to do something about it. The research community can help to change this by providing evidence of relevant trends and by indicating their consequences.



### ***Biography of Rob Methorst***

Rob Methorst is educated as a Human Geographer. In his work he specialized in road safety. He worked for local, regional and national authorities as well as the Dutch Pedestrians Association. At present he is programme supervisor Road Safety Behaviour at the Ministry of Transport, Public Works and Water Management

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## **Introduction**

In most countries - the Netherlands is no exception - policy regarding walking is focussed on solving urgent problems. A problem becomes urgent when it affects citizens in such a way that they ask the authorities to take action. Serious accidents have the same effect. In most cases these problems are very specific and localised. Consequently, apart from implicit policy and development planning activities, policy measures regarding pedestrian issues are predominantly demand driven and concentrated on safety issues. Citizens generally do not ask for a holistic or systems approach.

Since the seventies Dutch authorities have done much to improve road safety. They have been very successful. The total number of traffic fatalities dropped from over 3,200 in 1970 to approximately 1,000 in 2004. The decrease in the number of pedestrians killed is even more spectacular. In 1970 609 pedestrians were killed in traffic. In 1980, 296 pedestrian fatalities were reported and in 2003 96. The decrease in reported number of severely injured pedestrians (hospitalised) followed the same trend: from 2,168 in 1980 to 638 in 2003<sup>1</sup>.

In the Netherlands authorities feel that there are still too many road accident victims. However, it becomes increasingly difficult to improve road safety. The 'easy' policy measures have been taken: the provision of an extensive road and freeway network, safety belts, motor cycle and moped helmets, alcohol and speed enforcement. A second generation policy approach was developed: Sustainable Road Safety (Koorstra e.a., 1993). Key elements in this approach are:

- prevention is better than cure (proactive versus reactive)
- the transport system should be designed to accommodate the road users needs and competences.

The vision was introduced in 1992 and is now widely adopted. Current Policy makers realise that a systems approach has the best potential for lasting results. As a first step the road system was re-classified and more than half of the urban area is now 'traffic calmed'. Pedestrians and cyclists benefit from these structural improvements.

Up till now the system thinking has been largely confined to current needs. Recently a more dynamic view is taken<sup>2</sup>. For the development of the new National Transport Plan, AVV Transport Research Centre explored the road safety situation in 2010 – 2020. It was found that, if no action is taken, road safety will probably decrease because of an unfortunate cocktail of growing car use (50% more car traffic), increased goods transport (100% more goods transport) and an ageing of the population (Methorst & Van Raamsdonk, 2003).

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<sup>1</sup> Unfortunately not all accidents are reported. The quality varies over the years. From a validity study (Harris, 1989) we know that the quality of registration of fatal accidents nears 100%, but that non fatal accidents and accidents with non motorized road users are underreported. Furthermore there are signals that accident registration has degraded over the years.

<sup>2</sup> SWOV Road Safety Institute works on identifying consequences of future trends.

The 2010 – 2020 road safety prognosis was the first of its kind and was rather ‘quick and dirty’. Relevant trends were identified via a literature study and expert opinions. The estimations of consequences for road safety were attained through rather crude spreadsheet calculations.

From the Vulnerable Road Users study (Methorst, 2003) it was learned that the so called Pizza-model can be used for a more structural approach.

This paper deals with a first attempt to explore the future of everyday walking. The time-horizon is 2030. Everyday walking includes ‘functional’ walking from door (origin) to door (destination) and walking to and from other modes. Recreational walking (e.g. day trips, marathon running) is not included. The conference organisers asked to concentrate on suburban walkability.

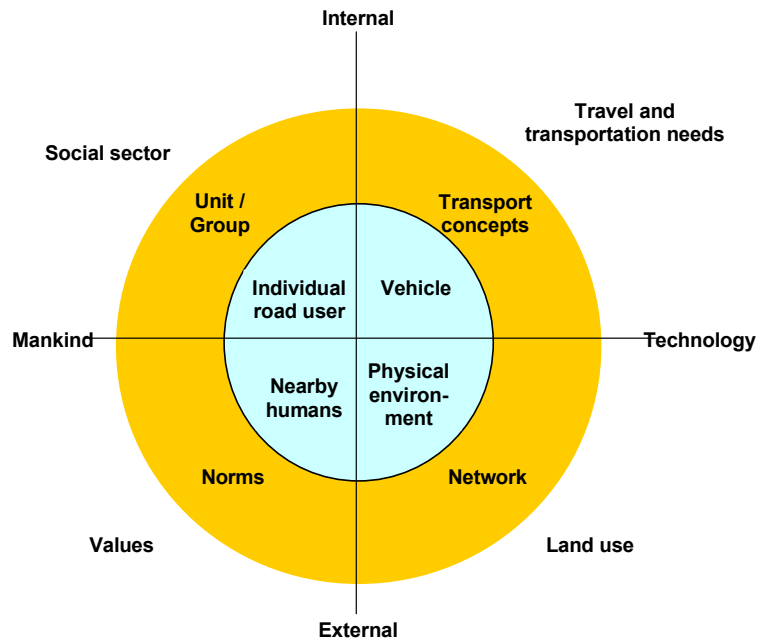
## ***The Pizza-model***

Traffic can be conceived as a system. People travel from A to B, on foot or by means of a vehicle. They travel on roads, which in turn are part of the spatial environment. The road network and the (immediate) environment is usually referred to with the concept *infrastructure*. When several road users make use of the road network, there have to be rules to ensure that this proceeds smoothly and safely. This means that the traffic has to be organised. The system components are thus:

- Road user  
In order to use the road in a certain role, one must have the knowledge needed for that role, insight, skills and attitudes
- Transport system  
The vehicle must be able to move and be steered or operated, that is to say, move in all directions and slow down and speed up. The vehicle must also offer protection to the occupants and minimize injury to other road users in the event of accidents.
- Physical environment  
The roads (infrastructure) must be designed and constructed in such a way that people can reach their destination easily and safely, regardless of the role (pedestrian, cyclist, moped rider, car driver, public transport user etc.) in which they do that.
- Social context  
The traffic needs to be organised. There is a difference between (1) the official rules (the traffic regulations) and the monitoring of compliance with these (enforcement) and (2) the implicit code about how one should behave in traffic, or how it should be arranged and organised. In the latter case, this is the context, culture, norms and values that exist.

The level of performance of the transport system and road safety thus depend on the sum of the qualities of the components: person, vehicle, environment and organisation / social context. The ‘Pizza model’ shows that there are different levels in the interaction of the components and the possibilities of influence (interventions). In the model, these levels can be seen as ‘layers’.

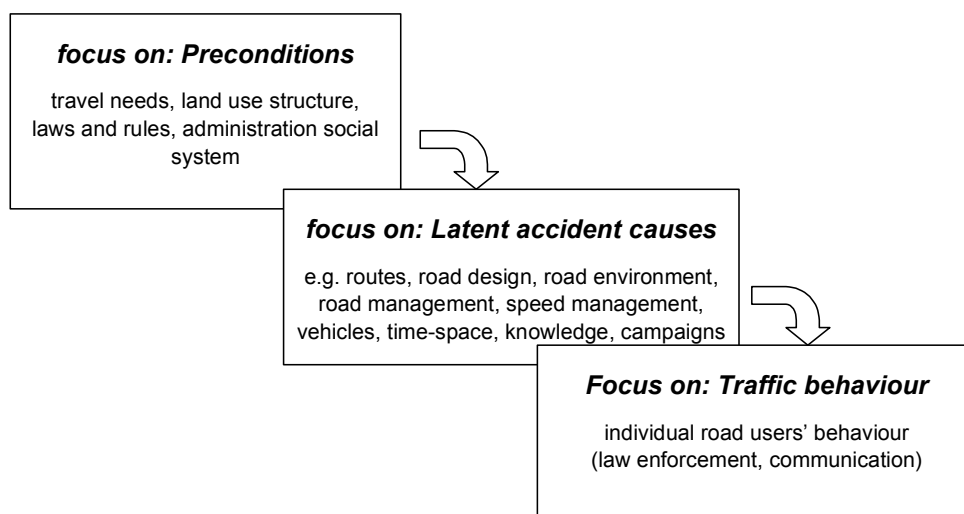
The axis reflect whether the influences are internal or external to the system and whether affected by the human or by technology. The top half of the model relates to the qualities of the mobile part of the system and the lower half to more ‘static’ environmental qualities that ‘pressure’ mankind to travel. In the left half are the qualities of persons, both personal and social. In the right half are the qualities of the ‘hardware’, the vehicle and the roads.



**figure 1 The Pizza-model**

The Pizza-model was developed as a means for policy development. Its aim was to form a source of inspiration for devising comprehensive transport and road safety interventions. Traditionally the road safety policy was mainly aimed at the core of the pizza, or the concrete measures that can be realised on the relatively short term and that produce relatively fast results. The middle level concerns mainly measures that are more far-reaching, take substantially more preparation, in the order of magnitude of 3 to 5 years, and usually do not result in demonstrable effects in the short term. In the outermost layer, processes take place gradually but very slowly. It can sometimes take thirty years for a change to have noticeable effects.

It is clear that the conditions of the outer layers set the context for performance. For instance risky crossing situations do not arise when there is no need to cross the street. If one needs to cross a street, crossing facilities can mitigate the risk but not entirely prevent accidents. Thus it seems sensible to focus policy making primarily on optimizing preconditions, secondly on latent accident causes and lastly, if nothing else is feasible, on behaviour improvement.



**figure 2 Cascade in focus of attention**

Evidently the Pizza-model can also be used as a conceptual model for making forecasts. Since preconditions change slowly and gradually, relatively reliable volume effects can be deduced from them. Meso level items can help to indicate quality effects, but core level behavioural items do not have great potential for forecasting, since these are not very constant.

## **Social context**

The social context influences the amount of walking and the quality of it. Important aspects in this respect on the macro level are: demographic trends, economic trends, trends in social organisation, trends in knowledge and technology and in safety. On the meso and micro level there are also some trends influencing the ease and safety of everyday walking.

## **Demographic trends**

According to Statistics Netherlands (CBS, 2005) in 2030 the country will have 17.9 million inhabitants (10% growth in 30 years). The composition will change substantially. The share of the elderly and non-Dutch ethnical groups will rise. The absolute number of children and youngsters will be approximately the same. There will be cohort effects on driving licence and car ownership: in 2030 most elderly females will also be able to drive a car.

## **Economic trends**

Entrepreneurs will continue to try to economize their businesses. In many cases they will achieve economy of scale through specialisation or enlarging their establishments. Both developments tend to diminish the total number of units. Customers will have to travel more and over larger distances. On the local scale this will mean that many daily destinations will no longer be within walking distances.

Structural trends, like ageing, a deterioration of the position of low-skilled workers, more heterogeneity in society and higher mobility of production factors all put pressure on European welfare states. Public expenditures increase, while raising public revenue is accompanied by rising social costs (De Mooij & Tang, 2003). The available budgets will have a significant impact on political decisions regarding facilities for everyday walking. Although policy developers and policy makers and politicians may agree on the fact that the situation for pedestrians is not perfect, like today they will probably think that other transport issues are more urgent. When budgets have to be cut even obvious qualities will decrease, especially when there are no loud cries for measures. Higher expenditure on pedestrian facilities is far from self evident.

## **Social organisation**

Economic and demographic trends will have a certain impact on social organisation. Because of the ageing of the population the ratio of the employed versus the unemployed and retired will change. The employed will retire at a higher age. This will affect their travel and modal choices.

The ageing of the population will also give rise to a substantially larger demand for services. That larger demand will probably not be met by the professional workforce, but by volunteers, particularly neighbours, family and friends.

In the future a large share of the population will be better educated. Better educated people tend to be more independent, individualistic and opinionated, but also less inclined to walk. They will also be more cosmopolitan, with friends, family scattered all over the country. The contrast between the haves and have-nots will be sharper. This will influence the negotiating position of the pedestrian in traffic, public space and decision making.

The average number of persons per household will decrease from 2.3 to less than 2.0<sup>3</sup>. This will influence housing demand and lifestyles. Small housing units will be more in demand. Bachelors and the divorced tend to be more mobile and less inclined to walk much. The majority of the (widowed) elderly however will be 'growing old in place' (OECD, 2001).

## Knowledge and technology

In the course of time, as a society, we learn. The efficiency of our actions grows. Because of improved health care and medical technology, accident victims that used to die, will now survive. Likewise traffic management improved substantially. Pedestrian' safety has benefited from this learning process, but that trend cannot be simply extrapolated.

Furthermore, with growing safety, people tend to accept less risk.

Insight in the extent and the severity of the problem is a crucial condition for policymaking and implementation. Pedestrian facilities are commonly seen as a local authority issue. On the local level policy makers and designers generally do not have much time for research and contact with colleagues regarding their experiences. This makes it rather unlikely that, without extensive external pressure, less obvious aspects like connectivity will be dealt with. When pedestrian safety does not keep pace with safety developments in other (transport) sectors, public opinion may become pressing. Another 'maybe' is that national statistics and studies influence the inclination to facilitate everyday walking.

At this moment statistics give a one-sided picture of the actual amount of walking; they relate to walking to and from other modes<sup>4</sup>. In most transport forecast studies walking is not considered. For policy development one needs to know what the actual needs are, now and in the future. This type of work has to be done at the national (or even better at the European) level. Seen from the current authorities position, that is not very likely to occur.

## Safety

In objective terms pedestrian safety (both road safety and security / public safety) improved. However, more important is how (potential) pedestrians perceive safety. Perception can force people not to walk, but choose other modes or refrain from a trip altogether. Because of perceived risks children are driven to school instead of walking. Because of perceived risk females and the elderly refrain from walking at night. Perception often is based on reports in the media and tales from friends and family. Improved information technology made the world smaller. Thus the number of reports on incidents increased and people wrongly believe that the risks have gone up. With the ageing of the population this might result in more frightened off potential pedestrians.

## Norms

The ageing of the population will probably lead to more prudent road user behaviour. In 20 years time the elderly will be a dominant group of road users; their careful behaviour will be the norm in traffic.

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<sup>3</sup> In the last three decades the trend was approximately –10% per decade. A further decrease of 5% per decade is expected. Family size will not decrease much; because of ageing of the population however (widowing) and divorcing the number of one person households will still grow somewhat.

<sup>4</sup> A limited explorative study revealed that almost half of all walking is part of multi-modal trips.

## **Nearby humans**

In 2030 traffic composition will have changed substantially. Although behaviour will be less aggressive than now, car traffic will be more intensive. The share of goods transport, both lorries and vans, will grow explosively. Crossing an main road will be difficult and risky because of the number of vehicles.

## ***Transport system***

### **Travel and transportation needs**

Travel and transportation needs follow social context and physical environmental trends. Travel choices will depend on the needs and the options people have. Hupkes (1977) indicated that statistically people seem to have a limitative travel time budget of approximately 400 hours per year. This travel time budget does not vary much over the years and for countries. Likewise the number of trips also seems to be fairly constant (on average 1,100 – 1,250 per person per year).

Modal choices however changed significantly. Economic and social trends (see before) and the spatial distribution of origins and destinations (see below), led to a growing car dependency and a further decline in public transport. Up till now in The Netherlands bicycle use was fairly constant, but with the ageing of the population bicycle use will decline somewhat.

There was and still is a steady decline in door-to-door (mono-modal) walking. Walking to and from other modes is expected to rise, because of growing car use and the growing distances one has to walk from the parked car to the final destination and back. In the suburbs, where most people dwell, most people do not walk much. Average distances to public transport stops will rise. Most will be out of reach for everyday walking.

Most destinations exceed acceptable walking distance of 5 minutes or 500 meters. In 20 years time this will be even more so. Mono-modal walking will be largely confined to a decreasing number of short trips within the suburbs and within city centres. It is to be expected that everyday walking will be predominantly walking to and from other modes.

### **Transport concepts**

Walking has to compete with less physically straining forms of transportation. Most experts believe that in 2030 the car will be even more dominant than it is now. In the Netherlands bicycle is there to stay. Public Transport will be confined to long distance travelling between larger centres; Dial-a-ride services, driven by volunteers, will have a future where demand is low. New transport concepts will probably be introduced. Most of them will take a long time to emerge. A promising new transport concept is the Segway. Though at the moment it is expensive and exclusive, it may become popular for short trips and thus be competition for everyday walking in the suburbs and town centres.

### **Vehicles**

Technological improvements will make cars, vans, busses and lorries marginally safer for pedestrians. Differences in mass and speed will not be fundamentally changed.

## Physical environment

### Land use

Since World War II The Netherlands had a restrictive planning policy. Despite the fact that the 'colonized' area approximately doubled in those 50 years, towns and cities are still relatively compact. For walking and cycling this is favourable. However, economic and social development now forces planning authorities to give in to demands for more space from entrepreneurs and home owners. Because of that and a foreseen growth in number of households, the urban area will probably again grow by 18 to 20%.

Now and in the future most people (will) live in suburban areas. More and more friends and family will live scattered all over the country, outside walking range. Almost all employees work outside their neighbourhood. So the majority of trips will not be walkable.

Due to economic forces the number of shopping centres, where also other essential services like medical centres, banks, drugstores, hairdressers reside, will decrease. Because of the larger need for space, those facilities will concentrate on the urban fringes. For a growing number of people those services will be beyond walking distance. Furthermore one can expect that e-shopping will grow. All these trends point in the direction of some 25% less intensive use of public space and pedestrian facilities<sup>5</sup>. This is not a favourable context for asking bigger budgets for management, maintenance and safety of public spaces. Authorities will probably try to economise on this.

**Table 1 Key figures regarding Land Use in NL**

	1970 (abs)	2000 (abs)	increase (%)	2030 (abs)	increase (%)
Built up area (sq. Kilometers)	2121	3183	50,1	3770	18
Built up area for housing (sq. Kilometers)	1883	2211	17,4	2619	18
urban roads (estimated total length)	33000	59000	78,8	69882	18
pedestrian facilities (estimated sq. Kilometers)	82,5	147,5	78,8	175	18
Population (x 1000)	12958	15864	22,4	17900	13
Number of households	3986	6801	70,6	8950	32
Average household size	3,25	2,33	-28,2	2,0	-14
Area pedestrian facilities per person	6,4	9,3	46,0	9,8	5
idem per household	20,7	21,7	4,8	19,5	-10

Source data 1970 and 2000: Website CBS Statline

On the other hand, there is a positive trend as well. Local authorities recognise the health care consequences of the ageing population and are now planning so called Elderly housing & Health care Areas, where adapted housing for the elderly, health care, community provisions and probably also odd jobs services will be concentrated. Thus authorities can reach economy of scale without the negative effects for the clients. Although this may not facilitate 'growing old in place', it certainly will help those who are no longer able to walk much and who cannot use a car.

<sup>5</sup> The number of potential users of public space will decrease by some 10% less persons; they will walk at least 15% less within the area.

Centrally located areas will attract more people and most of them will get there by car. In such situations it will not be possible to provide sufficient parking places nearby, therefore average walking distances to these destinations will increase locally.

## Network and site level

The British Pedestrians Association (now: Living Streets) propagated that the pedestrians' network be connected, conspicuous, convenient, comfortable and convivial (5 C's). A chain is as strong as its weakest chain. With regard to the 5 C's in The Netherlands the current pedestrians network is not perfect and in many cases not attractive enough to invite people to walk more. Because for (local) authorities other issues seem to become more important, a better pedestrians' network is not self-evident.

## Pedestrians

From the above exposé one can conclude that the future of everyday walking is largely dependant on external developments. There are however, also some relevant trends regarding the pedestrians population itself.

## Changes in the nature of walking

Whereas in the old days door-to-door walking was dominant, a growing number of kilometres and more time is spent on walking to and from other modes (multi-modal walking). According to CBS the average number of door-to-door-trips per person per day has dropped gradually from 0.62 in 1985 to 0.52 in 2003 (see Table 2). In 1993 the Dutch Pedestrians Association found that approximately one third of the total distance walked is 'multi-modal walking' and that multi-modal walking is not properly reported. In 2004 the share of multi-modal walking was nearly 50% (Methorst, 2005).

**Table 2 Reported mobility characteristics of walking (persons 12+)**

year	per person per day		
	trips	distance (kms)	travel time (minutes)
1985	0.62	0.65	8.78
1990	0.62	0.64	8.36
1995	0.57	0.66	7.93
2000	0.53	0.58	6.81
2003	0.52	0.57	6.79

Source: Website CBS Statline

## Changing pedestrians task competences

Because of ageing, the number of people with limited mobility (walking difficulties) will almost double in the next 30 years (see Table 3). People with limited mobility place a higher demand on the pedestrian facilities.

Furthermore in general the populations' fitness seems to be decreasing because of lack of exercise and obesity. People that are not fit will find walking strenuous and will walk less.

**Table 3 Predicted number of people with limited mobility**

	2005	2010	2015	2020	2025	2030
% people with limited mobility	6,1	6,3	6,7	7,0	8,2	9,4
Number Younger than 65	340,000	340,000	350,000	350,000	360,000	360,000
Number 65 - 79	250,000	270,000	310,000	360,000	400,000	430,000
Number 80+	410,000	430,000	460,000	490,000	660,000	830,000
Total number	990,000	1,050,000	1,130,000	1,200,000	1,410,000	1,620,000

source: Socialdata (2005) and assessments based on Rooij en Tacken.

## Changing risk and risk perception

Although the number of fatalities and serious injuries among pedestrians dropped substantially, this does not mean walking has become much safer. Parents find traffic so dangerous that a growing number of them do not permit their children to walk to school by themselves. Many elderly refrain from walking after dark or during the rush hours. This trend to limit exposure to potential traffic risk appears to be continuing.

## Conclusions

Within the context of this paper it is impossible to exhaustively forecast all aspects of the future of everyday walking. Used as a checklist, the Pizza model made it easy to form a notion of the future situation. If no action is taken the future of everyday walking is not very bright:

- The importance of everyday door-to-door walking will decrease, mainly because the number of desirable destinations within walking distance will drop. This will partly be compensated by multi-modal walking. Thus the amount of time spent as a pedestrian will probably not decrease much.
- For the majority of the population a diminishing quality of pedestrian facilities is not an important issue, since they do not really need high quality facilities and they have ample alternatives. On the other hand, walking will become more difficult and more risky for a growing part of the population: people with limited mobility and those that can not fall back on car use. Their quality of life is at stake.
- Awareness of the problem is crucial. At the moment politicians and policy makers do not get a fair representation of the importance of walking. As yet the growing importance of multi-modal walking is invisible; foreseeable problems and the (evident) benefits of walking are not systematically documented. Therefore politicians and policy makers can have no idea that there may be an upcoming pedestrian problem; as yet there is no compelling reason to do something about it. The research community can help to change this by providing evidence of relevant trends and by indicating their consequences.

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