1) **Exempel på parametrar som använts i en annan modell**

**Om vi vill lägga till flera parametrar för att göra simulationen mer realistisk**
Länk: https://www.sciencedirect.com/science/article/pii/S0925753500000643
Kapitel 4:
The occupant characteristics are defined by the user and will control body size, unimpeded walking speed, response time and the distance map to be used by the individuals or groups of people. The floor plans are segmented into 0.2×0.2 m grids, which are used to calculate travel distances, and to serve as a basis for the route finding functions in the model. The distance-maps can be specified by the user by designating the available exits for each distance-map and allocating different distance maps to individuals or groups of people.

2) **Evakueringstiden influeras av 3 komponenter**

**Om vi lägger till ex. en reaktionstid kan detta användas som underlag**
Länk: https://kluedo.ub.rptu.de/frontdoor/deliver/index/docId/1477/file/bericht24.pdf
Kapitel 1:
The evacuation time, that is the time needed to complete an evacuation process, basically consists of three main time components ([30], [47]) namely :

- The time evacuees need to recognize a dangerous situation. This time is influenced mainly by the reliability of the alarm system and the familiarity of evacuees with emergency signals.

- The time evacuees need to decide which course of action to take. This time is influenced by the experience of evacuees in facing the emergency situation. This can, for instance, be generated through emergency practice and training.

Behavioural and organizational factors are the main contributors to the duration of these times. The subsequent decisions are made during the movement to the safety, especially when evacuees encounter a "hazard" route, i.e. one which is affected by re, smoke, etc.

- The time evacuees need to move towards the safety area, which is known as egress time. The latter is in infuenced by the availability of emergency exit signs, well planned evacuation procedures, constructional factors (effective width of walkway, slope of stairs), and human behaviour during panic situations.

Since the behavioural and organizational factors are the main contributors to the first two time components, it is hard to predict analytically the duration of those time components. Therefore, most evacuation models emphasize the calculation of egress time and treat the result as the lower bound of the real evacuation time. This will also be the approach in this paper

3) **Exempel på hur val av riktning kan modelleras som en nätverk av nodes där varje steg är ett individuellt beslut**

**Om vi vill göra modellen mer matematiskt robust**
Länk: https://kluedo.ub.rptu.de/frontdoor/deliver/index/docId/1477/file/bericht24.pdf
Kapitel 11:
In microscopic models each evacuee is considered as a separate flow object. An evacuee will be exposed to accident effects depending on the route he/she follows and the length of time spent in different locations. An evacuee selects the route 'step by step', which means that the choice of the next piece of the route is decided at every node along this route. The initially selected route might be changed due to some reasons, for instance, blockage by re or high congestion. Figure 10 shows an example of the evacuation process as it can be modeled for each person. Microscopic models emphasize the modeling of human behavior during an emergency situation. The human model can be provided with some personal attributes, for example, walking speed, personal memory and psychological condition. These attribute will be used to determine the movement decisions, for example [21], to select the nearest walkway, move on the walkway only when there is no blockage at the end, or change the destination target before reaching it.

4) **Hur arenan i en evacuation simulation kan delas upp i noder**

**Eventuellt en referens till att vi valde att ha en grid som layout för rummet**
Länk: https://www.sciencedirect.com/science/article/abs/pii/S0360132304002161
Kapitel Introduction:
The present simulation models can be divided into two categories: fine and coarse networks. In the fine network approaches, such as EGRESS, BGRAF, EXODUS, MAGNETMODEL, SUMULEX, VEGAU [1], the compartments in a floor space are usually divided and covered with tiles or nodes, whose sizes and shapes vary from model to model. This kind of model are more complex and usually need more memory, input time, and running duration but can accurately represent the real space layout of the enclosure and locate the internal obstacles and each individual at any time. On the other hand of the coarse network methods, like CRISP II, DONAGAN'S ENTROPY MODEL, EXIT89, EXITT, E-SCAPE, EVACSIM, EVACNET4, PAXPORT, TAKAHASHI'S MODEL, WAYOUT [1], the floor structure is represented by nodes and arcs. Irrespective of the enclosure sizes, each node stands for a compartment, which includes a room, a corridor, a hallway, etc. This method is simpler and needs less input work and running time. However, it is not easy to trace the individual movement in the simulation

5) **Hur människors beteende adderar en osäkerhet i mätningen av utrymningstid**

**Bra genomgång av behovet att addera "noise" till agenters rörelse för att simulera utrymning korrekt**
Länk: https://www.sciencedirect.com/science/article/pii/S0951832014001628
Kapitel Introduktion och 3.1:

1. The achievement of an acceptable level of safety is generally the main objective of fire safety engineering [1]. In the context of fire evacuation, the level of safety is studied by comparing the time required by the occupants to evacuate buildings safely (i.e. the RSET, Required Safe Egress Time) and the time until the conditions are not tenable (i.e. the ASET, Available Safe Egress Time) [2].

2. Guo et al. [28] conducted an evacuation experiment with 30 participants who repeatedly had to evacuate simultaneously from a class room. In total, twelve repeated trials were realized. Two independent variables were manipulated. First, participants were randomly assigned to one of six different seating positions in each trial. Second, in 50% of the trials, participants were blindfolded to simulate zero visibility conditions. That is, each participant experienced each seating position once blindfolded and once without full visibility. In each trial, participants started to evacuate from the classroom after they were given an acoustic signal.

6) **Väldigt liknande vår studie fast de simulerar urban evakuering med olika typer av vägnätverk m.h.a agent-based modelling**

Länk:
https://www.tandfonline.com/doi/full/10.1057/palgrave.jors.2602321?casa_token=mQX4Ae2-AYYAAAAA%3A4Qwdaaj1MgDzgRVMr-QyrYk-BVFviN_tkj-NdKC_uftAKuLsKMWaZrn4N1sU1IQsFZQa_grbckhB_w#d1e275
Kapitel Introduktion och Route and destination choice:
1.Agent-based modelling decomposes a complex system into a number of constituent units called agents. Each agent is assumed to follow a set of rules to interact with other agents and its environment. The power of agent-based modelling lies in its ability to capture the collective behaviour of all agents in a complex system. This collective behaviour is often called emergent behaviour

2. This study assumes that all drivers have a good knowledge of the area and follow the fastest (least time) route to evacuate to their destinations. We used dynamic routing procedures available within Paramics to determine the fastest evacuating route for each vehicle. Dynamic routing assumes that drivers adjust their routes dynamically based on real time traffic conditions while en route. This assumption means that vehicles from the same origin may take different evacuating paths to get to their respective destinations because vehicles at the same origin may have to enter the queue of evacuating vehicles at a different time and thus face different traffic conditions while they are on the road.

7) **Agent-based model av utrymmning av stora byggnader vid eld**

**Om vi vill lägga till att simulera faran (ex. vart elden börjar). Har också en probabilitetsbaser metod för att hantera att personer befinner sig på samma position i positions-gridden.**
Länk: https://www.sciencedirect.com/science/article/pii/S0926580508001544
Kapitel 1:
1.It is discovered from many fire hazard cases, that fumes caused by fire is the main factor that threatens human life [3]. Thus, fire and combustion products must be taken into account when the building is on fire. The products may contain toxic substances and bring physical and psychological hazards to the occupants in environment. For instance, in the fire accident that happened in Luo Yang Dong Du department store, approximately 309 people died from fumes poisoning and suffocation. Thus the spread and distribution of fumes has an important affection to crowd evacuation. Meanwhile, occupants will make their response to the environment and adjust their evacuation strategies according to the surrounding situations. Obviously, in the fire environment an interaction between occupants and fire field exists. Therefore, the task of simulation model is not only to create and append these components but also to accurately represent the relationships among them.

2.At each time step, each agent has three fundamental problems to decide: (1)The selection of routine, which means where to go at the next step. This relates to some factors like the building environment (exit position, obstacle distribution etc), fire condition (fire source, fumes condition around etc) and the human psychology. The model represents the effects of these factors on evacuation by 'environment driving factor'. The 'environment driving factor' includes exits driving factor, danger eject factor and crowd attraction factor. (2) How to decide the variation of speed? Speed describes how fast the occupant can move within the scene. Normally free walking speed can be regarded between 1.2 m/s and 1.8 m/s. Also some experimental data suggests that it varies as a function of age for males and females taken from Ando et al. (1988). (3) How to solve the conflict when one occupant contests with others for one grid synchronously? It is likely that there is more than one occupant entry into one grid ($x_i$, $y_i$) at the same time step during the simulation. As we divide the grid to contain only one person, the case that more than one occupant occupy one grid is not allowed. When such instance occurs, the conflict treatment will be performed according to the principle of equal probability. An occupant will be selected in random to enter into the position. Besides, due to the variation of individual speed, when the velocity of the latter person is faster than the former, he either stops to wait in his place or move by side to the front position.