Fire and Materials

WILEY

RESEARCH ARTICLE OPEN ACCESS

Exploring the Relationship Between Rescue Service Response Times, Citizen Satisfaction and Ownership of Fire Safety Equipment in Sweden

Kenny Turesson[1] | Rebecka Andersen[2] | Finn Nilson[1,2,3] | Ebba Henrekson[2,4]

[1]Division of Risk and Environmental Studies, Karlstad University, Karlstad, Sweden | [2]Center for Civil Society Research, Marie Cederschiöld University, Stockholm, Sweden | [3]Division of Risk Management and Societal Safety, Lund University, LTH, Faculty of Engineering, Lund, Sweden | [4]Center for Educational Leadership and Excellence, Stockholm School of Economics, Stockholm, Sweden

Correspondence: Kenny Turesson (kenny.turesson@kau.se)

Received: 1 July 2024 | **Revised:** 2 September 2025 | **Accepted:** 11 November 2025

Keywords: individual fire safety | rescue service | responsibility | risk management | satisfaction | societal protection

ABSTRACT

This study investigates how rescue service response times and staffing solutions relate to both citizen satisfaction with rescue services and the adoption of individual fire safety measures in Sweden. Data were drawn from Statistics Sweden's satisfaction index, rescue service response times from KOLADA, and survey data from the Swedish Civil Contingencies Agency on ownership of functional smoke detectors and fire extinguishers. Previous research has emphasised trust and confidence as important aspects of risk management, where satisfaction reflects confidence in governance and public services. In Sweden, confidence in public actors is high, yet individuals are increasingly expected to take responsibility for their own safety. Using Statistics Sweden's satisfaction index to measure satisfaction with rescue service, regression analysis controlled for sociodemographic variables, followed by moderation analysis comparing municipalities with full-time or part-time staffed rescue services. Part-time rescue services have, on average, slower response times than full-time services. Survey data on functional smoke detectors and fire extinguisher ownership were used to explore the probability distribution of owning fire safety equipment in relation to the staffing solutions of rescue services. Findings show that longer responses decrease satisfaction in municipalities with full-time staffed rescue services, while response times do not influence satisfaction in municipalities with part-time rescue services, suggesting that expectations differ from those in municipalities with full-time rescue services. However, municipalities with part-time rescue services display higher ownership of fire safety equipment, suggesting compensatory behaviour for slower response times. The study highlights the need for further research on the relationship between satisfaction and responsibility for fire safety.

1 | Introduction

The protection against residential fires involves a collaboration between individuals and society, where both parts must contribute to reducing the risk of adverse outcomes. Whilst the precise reasons for why a fire results in the absence of injuries or fatalities are contextual and complex, it is clear that the actions of individuals are critical [1]. However, with increased individual vulnerability, the risk of not coping with a fire greatly increases, as does the risk of fire mortality [2–9]. In Sweden, recent studies have shown that educational level, housing situation, population density, income and income distribution, as well as having a foreign background are associated with fire morbidity and mortality [5, 10]. In other words, higher vulnerability is a dominating risk factor. In such cases of higher vulnerability, societal protection, particularly the effectiveness of rescue services, has been shown to be at least as important in predicting the risk of fire-related mortality as individual vulnerability [11]. This underscores that the capabilities of local rescue services can play a crucial role in safeguarding vulnerable populations.

Consequently, the capabilities and placement of rescue services have become a highly debated topic. Typically organised at a municipal level these services vary in their effectiveness due to differences in economy, geography, and population size, resulting in varying levels of capability [12]. This is particularly evident with respect to response times, the most critical factor in saving lives [13–15]. In Sweden, part-time rescue organisations have, on average, 5 min longer response times compared to full-time organisations [16], a difference that significantly impacts mortality risk [14].

Often, rescue services view low levels of individual trust in their capabilities as problematic due to its potential effect on personal protection. For example, low trust individuals may be less receptive to information efforts aimed at promoting fire and accident prevention actions [17], although this connection remains uncertain. Moreover, a Swedish study has shown that the public generally accepts differences in response time between rural and urban areas [18], suggesting that slower response times may not necessarily erode trust. Importantly, such evidence may be less related to whether rescue services are urban/rural or fast/slow but more related to whether rescue services are full- or part-time. Part-time organisations, mainly consisting of staff who have another regular job and are on-call for certain periods during a month, typically have slower response times. However, part-time staff arguably have stronger social connections within the local community, which might lead to greater tolerance for slower response times. In addition, a higher degree of social capital or trust may compensate for reduced rescue service effectiveness due to generalist competence and improvisation skills [19].

Previous research underscores the existence of multiple perspectives about the nature of trust. For example, Licht and Brülde [20] regard trust as a form of reliance in the sense that a person depends upon someone to do or ensure something. In comparison, Jones [21] emphasises expectation as a core element of trust, while Siegrist [22] notes that studies often make a distinction between certain aspects of performance and values as components of trust. Additionally, satisfaction has been positively associated with trust [23], with high satisfaction with public service performance being linked to higher levels of trust [24].

The concept of satisfaction as an element of trust is particularly relevant for rescue services. As highlighted above, there is an acceptance of lower levels of service in rural areas, coupled with a strong social connection between inhabitants and part-time staff. This suggests that satisfaction with rescue services may not necessarily be linked to response times. However, this hypothesis relies on the key assumption that citizens are aware of the type of rescue service provider in their local community, as well as their response times. Perhaps surprisingly, a previous study on Swedish data has shown that individuals' perceived risk of fire morbidity is higher in those municipalities where rescue services response time is slower [25], thereby suggesting that individuals' evaluation of rescue services performance might influence perceived risk. Hence, it appears feasible to determine one's level of risk. This, in turn, raises the question of whether risk perception influences individual fire safety practices. As such, this study aims to investigate the relationship between satisfaction with rescue services—by using a satisfaction index at the municipal level—and rescue service response times, and examine whether full- or part-time rescue services moderates this relationship. The study also investigates if ownership of functioning smoke detector or fire extinguisher have any relationship with response times by rescue services.

Understanding these dynamics provides important insights into the relationship between institutional trust and individual-level safety practices. More specifically, by exploring how satisfaction with rescue services relates to response times and potentially influences individuals' fire safety measures—such as the presence of functional smoke detectors or fire extinguishers—this study offers insights into the broader question of how institutional performance and trust shape proactive safety practices at the individual level.

2 | Material and Methods

This study draws on four distinct sources of data to explore satisfaction with rescue services and related outcomes at the municipal level in Sweden. First, it uses aggregated data from Statistics Sweden's (in Swedish, Statistiska Centralbyrån (SCB)) annual Citizen Survey (2011–2020), which captures individual satisfaction with municipal rescue services. Second, sociodemographic control variables were retrieved from SCB's official population and income registers. Third, data on municipal rescue service staffing models (full- or part-time) and average response times were obtained from the open-access database KOLADA and SCB respectively. Finally, individual-level data on fire protection behaviours—such as the presence of functional smoke detectors and fire extinguishers—were sourced from the Swedish Civil Contingencies Agency's national Fire and Fire Protection Survey.

2.1 | Statistics Sweden's Citizen Survey

The data on satisfaction with rescue services was retrieved from SCB's annual Citizen Survey (2011–2020). The survey explores how individuals assess their municipality's management of operations and services, as well as the extent to which they feel they can influence municipal decisions. It consists of 88 core questions, with the possibility of including additional questions requested by specific municipalities. The topics covered include education, housing and the living environment, perceived safety, equity and equality, integration, trust, and confidence. The target population during the period 2011–2020 was registered individuals between 18 and 84 years, and the sample was randomised. The sample size was determined by the population size of each municipality. As a standard, 800 individuals were sampled in municipalities with fewer than 10 000 residents, 1200 individuals in municipalities with populations between 10 000 and 59 999, and 1600 individuals in municipalities with more than 60 000 residents. In 2017, SCB increased the sample size for municipalities with fewer than 10 000 residents from 600 to 800 individuals, due to varying response rates [26].

Regarding municipal participation in the Citizens Survey, not all municipalities took part every year. Some took part only once during the period 2011–2020, whilst others participated multiple times (188 municipalities (70.7%) participated five times or less and 78 (29.3%) participated 6 times or more). The satisfaction index is based on the question 'what do you think about the rescue services in the municipality?', with responses rated on a 10-point Likert scale. The question and the scale remained the same during the specified survey period. 1–10 is the rating from lowest to highest rating. SCB has then aggregated the level of individuals' satisfaction to an index at the municipal level using the partial least squares method [27]. The resulting index ranges from 0 to 100. To validate the conversion, SCB conducted follow-up questions, asking respondents to indicate where on the scale they felt different assessments belonged. According to SCB, an index score of 40 or below is classified as 'not approved', a score of 55 as 'satisfied', and scores above 75 can be interpreted as 'very satisfied' [27]. Since not all municipalities participated in the survey every year, a mean was computed based on how many years each municipality participated. The mean satisfaction across the municipalities was 75.2 (Table 1).

2.2 | Sociodemographic Data at the Municipal Level

To account for confounding factors and to isolate the effects of the predictor, a set of control variables was included. Sociodemographic data at the municipal level (see Table 1) were retrieved from SCB. Sweden has a long history of population data registration. The introduction of the personal identification number (PIN) in 1947, along with the total population register containing detailed sociodemographic information, ensures that Sweden has highly reliable sociodemographic data [28]. SCB collects data both through its own surveys and from other Swedish agencies and makes this information publicly available [29]. The control variables included in this study have previously been identified as being related to an increased risk of residential fires [10] as well as an increased mortality risk [5]. The variables deemed relevant were: *tertiary education*, *children < 18 living at home*, *single households*, *population density*, *median income*, *Gini coefficient* and *foreign background*. Statistics Sweden defines *foreign background* as an individual not being born in Sweden, or being born in Sweden with two parents born in a foreign country [30]. The variable measures the proportion of this group within the total population in each municipality. *Population density* is the number of inhabitants divided by square kilometres. *The Gini coefficient* is calculated by analysing the income distribution within a population; Statistics Sweden uses disposable income after taxes and transfers to calculate the coefficient [31].

2.3 | Information on Rescue Services

Average municipal response time data over a 3-year period, and information about rescue services being full- or part-time were retrieved from KOLADA, which is a non-profit and open access database. Rescue services are staffed with either full-time or part-time personnel. In rescue services staffed by part-time personnel, all responders must first assemble at the fire station before proceeding to the incident. How rescue services are staffed varies between municipalities and different combinations of organisation of fire stations can exist within a municipality. Therefore, to make it possible to compare full-time and part-time staffed rescue services, each municipality was categorised as full- or part-time depending on whether municipalities have full-time staffed rescue service or not [25]. That is, only municipalities with exclusively part-time rescue services were classified as part-time.

2.4 | Data on Individual Fire Protection Measures

Finally, a dataset from the Swedish Civil Contingency Agency's survey on fire and fire protection [32] was used to obtain data on individual fire protection habits, specifically regarding whether individuals had working fire alarms and/or fire extinguishers.

TABLE 1 | Descriptive statistics for municipal-level variables (means, standard deviations, and ranges) and data sources.

Variable	*N*	Mean	SD	Min	Max	Unit	Source
Satisfaction index	266	75.2	3.5	64.4	84.2	%	SCB
Response times	266	12.6	2.9	7.6	28.6	Minutes	KOLADA
Population density	266	146.0	514.9	0.21	6158.5	Nr inhabitants/km^2	SCB
Gini coefficient	266	0.276	0.031	0.229	0.523	0 to 1	SCB
Median income	266	295.8	29.9	245.9	424.5	Crowns	SCB
Tertiary education	266	34.79	9.81	21.5	74.2	Education three or more years after upper secondary school	SCB
Children < 18 living at home	266	24.5	4.67	15	38	%	SCB
Single household	266	45.6	4.3	33	54.6	%	SCB
Foreign background	266	19.8	8.9	7.9	60.7	%	SCB
Part-time organisation	266	0.428	0.49	0	1		MSB
Full-time organisation	266	0.571	0.495	0	1		MSB

The purpose of the survey was to explore the degree to which Swedish households had experienced residential fires and their protection levels. The survey included questions about smoke detectors, extinguishing equipment, exercise and evacuation and personal experience of residential fire. This study used data from two survey questions: 'Do you have a working smoke detector?' and 'Is there a fire extinguisher in your home?', both of which had binary response options ('yes' or 'no'). The targeted population was individuals in Sweden age 18 and above. The sample was two-fold: a national selection comprising 11 987 individuals and a sample from five municipalities comprising 10 010 individuals. Out of the 21 928 households receiving the survey, 9.411 responded resulting in a response rate of 43%. The response rate was 42% at the national level and 44% in the five municipalities. The data on ownership of working smoke detectors and fire extinguishers were aggregated at the municipal level. The municipalities were then split between full-time and part-time staffed municipalities, and percentage was calculated based on population size within the category of either full-time or part-time category. For comparison within full- and part-time municipalities, fast and slow categories were created based on median response time respectively.

3 | Statistical Analysis

The statistical analysis was conducted by performing a multiple regression analysis and a moderation analysis. A total of 266 municipalities were included in the regression model and the regression analysis tested for the relationship between satisfaction and response time, while controlling for the socioeconomic variables. Twenty-four municipalities were excluded from the dataset because they had missing data in at least one of the variables. The moderation analysis tested for the moderation effect of a part-time organisation on the relation between satisfaction and response time.

Municipalities were then categorised into one of four quadrants based on response times and rescue service organisation. Each municipality was categorised as either full-time or part-time, and then as 'fast' or 'slow' based on whether its response time was below or above the median for its category. Data from the survey on fire and fire protection [32] was categorised based on the individuals' reported home municipality. A chi-square test was then performed to investigate any significant differences between the groups.

SPSS version 28.0.1.1 with add-on PROCESS v 4.2 was used for all analyses.

4 | Results

Starting with the relationship between response time and satisfaction with rescue services, it is important to note that, in general, the levels of satisfaction were high. The mean value on the satisfaction index for all municipalities was 75.18. For full-time the figure was 75.91 and for part-time 74.20. The regression analysis (Table 2) showed that satisfaction decreased as the average response time increased, indicating that slower response times were associated with lower rescue service satisfaction. Among the control variables, there were no significant relationships.

To assess the effect of organisational form, a moderation analysis was performed. As shown in Table 3 and Figure 1, a significant interaction effect was observed indicating that the relationship between satisfaction and response time was moderated by the rescue services' organisational form. Specifically, full-time rescue services exhibited a negative relationship between response time and satisfaction—satisfaction decreased as response times increased—while no such relationship was observed in part-time organisations (see Figure 1).

To assess whether response times affect individual practices, municipalities were grouped into full- and part-time rescue services and then split into subgroups based on the relationship to the median response time in each group. This resulted in 'faster' and 'slower' full- or part-time municipalities (i.e., the average response time in a full-time municipality was only compared to other full-time municipalities). The aggregated data on individual fire protection equipment were then related to these groups. The chi square test (Table 4) showed that there were significant differences between part–/ full-time municipalities, as well as between 'faster' and 'slower' municipalities, and whether individuals had functional fire alarms and extinguishers. Importantly, and in line with the levels of satisfaction, the overall levels of having functional fire alarms and fire extinguishers were already at high levels. The reason behind these high levels should be studied more thoroughly in future papers. Despite this, the differences between full- and part-time were statistically significant with 94% of individuals in full-time municipalities having functional fire alarms and 72% having fire extinguishers whilst 96% had functional fire

TABLE 2 | Regression analysis. Dependent variable satisfaction index.

Response time	−0.308* (−0.476, −0.141) (0.085)
Tertiary education	0.081 (−0.001, 0.163) (0.041)
Children < 18 living at home	−0.132 (−0.370, 0.107) (0.121)
Single household	0.049 (−0.139, 0.236) (0.095)
Gini coefficient	- 12.125 (−29.318, 5.069) (8.731)
Population density	0.000 (−0.001, 0.001) (0.001)
Foreign background	−0.038 (−0.107, 0.031) (0.035)
Median income	0.009 (−0.024, 0.042) (0.017)
Intercept	78.817*** (64.093, 93.540) (7.477)
N	266
R^2 (adjusted)	0.066

Note: ***$p < 0.001$, **$p < 0.01$, *$p < 0.05$.

alarms and 81% had fire extinguishers in part-time municipalities (Table 4).

As shown in Table 4, when comparing within full- and part-time municipalities, significant differences were seen in all comparisons except for owning a fire extinguisher in part-time municipalities. When comparing within full-time municipalities, both the likelihood of having a functional fire alarm and a fire extinguisher was greater in municipalities with rescue services having response times that were slower than the median of full-time organisations. In part-time municipalities, individuals living in municipalities with rescue services faster than the median response time were significantly more likely (96.48%) to have a functional fire alarm compared to those slower than the median (93.67%), despite the very high level (96%) for all part-time municipalities. However, no significant differences were observed in terms of having fire extinguishers.

TABLE 3 | Moderation analysis. Dependent variable satisfaction index. Independent variable response time. Moderator part-time organisation.

	b	SE B	*t*	*p*
Constant	75.220 (74.573, 75.868)	0.33	228.64	0.000
Response time	−0.624 (−0.947, −0.302)	0.164	−3.814	0.000
Part-time org.	−1.013 (−1.948, −0.079)	0.475	−2.135	0.034
Response time × part-time org.	0.626 (0.261, 0.992)	0.186	3.375	0.001

Note: $R^2 = 0.106$.

5 | Discussion

The results from this study clearly indicate that the reported levels of satisfaction with rescue services are related to rescue service response times. Specifically, when average response times increase, levels of satisfaction decrease. However, a moderation analysis reveals that this relationship holds only in municipalities with full-time rescue services. That is, the relationship between satisfaction and response time was only observed in municipalities with rescue services having full-time staff, while no such relationship was seen in municipalities with part-time staffed rescue services. Apart from seemingly affecting the population's satisfaction with rescue services, the results indicate that organisational form and response times also impact the likelihood of having fire protection equipment (a functional fire alarm and fire extinguisher). Those living in part-time municipalities were more likely to have fire protection equipment compared to those in full-time. However, when in-group analyses were performed, owning a functional fire alarm was more likely in part-time municipalities with faster rescue services while the reverse was true in full-time municipalities. No significant difference was observed within part-time municipality type concerning owning a fire extinguisher.

Combined, the results therefore indicate that satisfaction levels with rescue services seem not only relatively rational from an objective deliverance of service perspective, but that satisfaction levels are also closely related to individual protection measures. This could be understood in relation to expectations, an important aspect of the concept of trust [22]. The expectation on rescue services is that they will arrive quickly when needed, something that is clearly supported by the result of the moderation analysis in this study. There appears to be an expectation for full-time

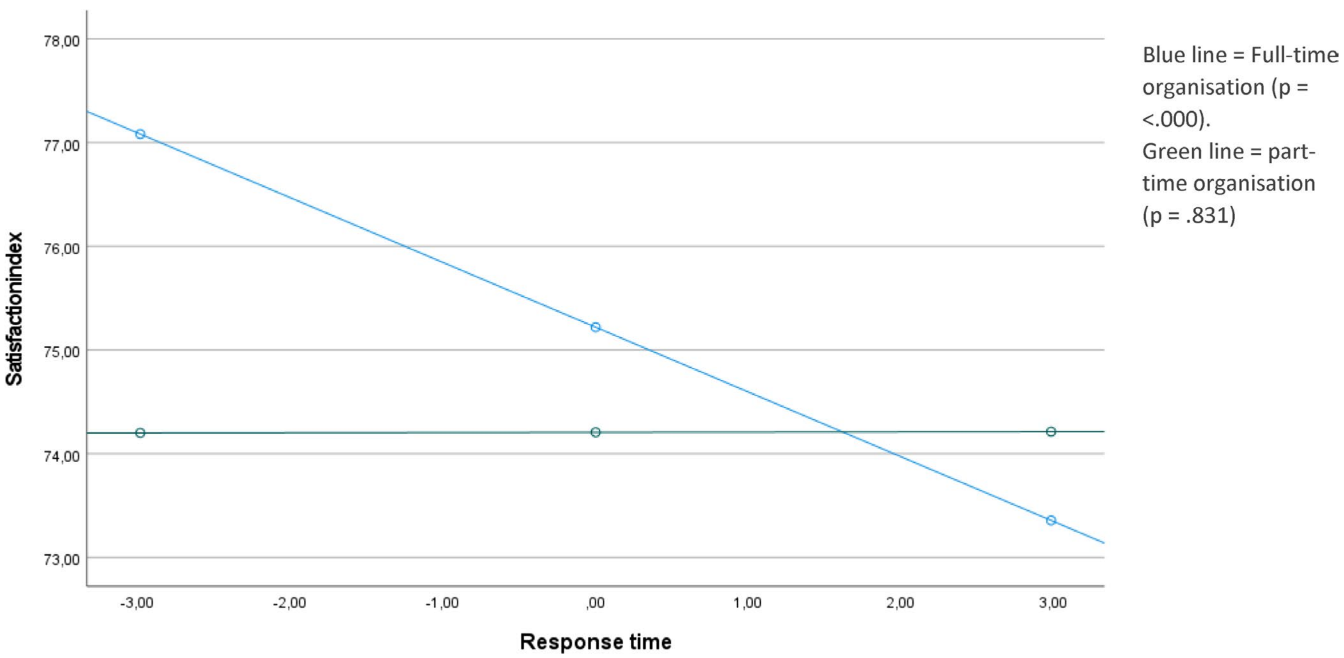

FIGURE 1 | Moderating effect of rescue service organisational form on the relationship between response time and satisfaction.

TABLE 4 | Results of chi-square test on fire protection equipment ownership by rescue service staffing solution (full-/part-time) and response time (faster/slower).

Fire protective equipment	Organisational form	X2	*Φ*	df	*p*	Cond. Prob.
Functional fire alarm	Full-time	5.22	0.024	1	0.02	94.15%
	Part-time					95.68%
	Full-time fast	10.06	0.037	1	0.001	93.36%
	Full-time slow					95.10%
	Part-time fast	5.41	0.062	1	0.02	96.48%
	Part-time slow					93.67%
Extinguisher	Full-time	45.5	0.072	1	< 0.001	72%
	Part-time					81%
	Full-time fast	45.36	0.078	1	< 0.001	68.81%
	Full-time slow					75.84%
	Part-time fast	0.089	0.0074	1	0.781	80.90%
	Part-time slow					80.25%

rescue service organisations to arrive quickly, and when this expectation is not met, the level of satisfaction decreases. The fact that this relationship was not observed in the context of municipalities having part-time rescue service organisations is interesting. Although the levels of satisfaction are generally lower in municipalities with part-time rescue service organisations (reflecting their slower average response times), the satisfaction levels did not decrease further with longer response times. This indicates that expectations for rescue service performance differ between full-time and part-time organisations, regardless of their actual performance. From a practical point of view, the results also imply a potentially challenging hypothesis: if high levels of satisfaction are perceived as desirable it would seem beneficial to only have full-time organisations when response times can be kept low. If this isn't possible, part-time organisations may be more beneficial.

Turning to the relationship between the level of societal protection and individual protection, the results also point to a problematic situation in that the likelihood of taking fire prevention measures increases with poorer service (both in terms of organisational form and relative response time). This could be understood as an expression of reliance, in the sense expressed by Licht and Brülde [21] as 'A judges B to increase the probability for C'. Which in this study would convert to: the individual (A) judges rescue services (B) to increase the probability for providing help in time of saving lives and property (C). If this is the case, rescue services are faced with a paradox. While it is well known that speed is essential for saving lives, in similarity to many countries, Sweden is in the process of transferring responsibility for risk prevention from the state to the individual [33] due to limited public funds. As such, rescue services want individuals to take a greater personal responsibility for their own safety.

The results could be read as suggesting that reduced effectiveness of rescue services might encourage greater individual responsibility. At the same time, such an interpretation raises concerns about unintended consequences, including a possible rise in fire-related fatalities and costs.

This is clearly problematic but not an entirely new finding. Rather, similar findings have been shown in research on disaster risk management [34]. However, the issue is probably not as clear-cut as this would presume that high trust would directly imply low preparedness and vice versa. Swedes are well-known for having high levels of trust in public actors to provide help when needed and in accordance with the findings, an assumption would be that there were low levels of preparedness and protection. However, this is clearly not the case as indicated by the already high levels of having functional protective equipment. Licht and Brülde [21] also emphasise that the notion of normative responsibilities is contextually dependent in the sense that different aspects might be more or less relevant, and the strength of importance will vary. This could explain that even if individuals in municipalities with part-time organisations have lower levels of trust and lower expectations on the performance of rescue services, this might just be rational due to part-time rescue services having longer response times [16]. By not expecting that rescue services will arrive on time to provide the required help, there might be a perceived need to have one's own functional equipment to increase the capability and probability of extinguishing fires self. This in contrast to having the expectation of rescue services' lower response times, in which the incentive to own fire extinguisher equipment might not be as great. This could hypothetically be understood from the perspective of rational choice [35]. Put simply, the incentive might not be great enough to buy a fire extinguisher if the expectation is that the rescue service will arrive on time.

As shown in this study, the levels of satisfaction are generally high, with a mean index of 75.2 across the municipalities. Kaasa and Andriani [36] have shown the importance of cultural context and that a smaller distance between citizens and political power positively influences institutional trust. However, in the case of Sweden, Erlingsson [37] has shown that this is not the case. Instead, citizens in Sweden have less trust in local governments compared to the central government. This is interesting given that rescue services are a matter for local government and have been shown in this study to enjoy high levels of satisfaction, thereby strengthening previous research suggesting that rescue services enjoy a separate trust compared to local government in general [38].

6 | Limitations

Whilst the results from this study highlight several policy-related challenges, there are limitations to consider when interpreting the data. First, Sweden has regulations aimed at increasing the prevalence of smoke detectors. This is similar to initiatives in the US, where legislation in building codes has led to a general increase in smoke detector ownership [39]. Therefore, the results showing high levels of ownership of smoke detectors should be cautiously interpreted to be related to trust. It is reasonable to think that the high levels of smoke detectors are a result of regulations and, as such, may not reflect an active individual choice based on perceptions of rescue service response times. On the other hand, studies show that simply making smoke detectors freely available does not necessarily improve protection, as they require maintenance such as battery changes [40–43]. This suggests that regulations may have limited impact unless individuals are motivated to maintain their own safety. To account for these types of issues, we chose to look at the presence of *functional* smoke detectors rather than just smoke detectors. However, the fact that the data on functional smoke detectors is based on self-reports warrants caution when interpreting the results. There may be a desirability bias, meaning that undesirable behaviours are underreported, which in this study could imply that respondents report having a functional smoke detector even if they are unaware of or have not checked its functionality. The implication is that the results of the analysis reflect reported, rather than actual, conditions or behaviours. Secondly, it is worth noting that the regression model explains only 6.6% of the variation. This may be due to the complex nature of satisfaction as a concept, and the varying interpretations respondents may have when answering survey questions—factors that pose challenges to achieving high validity. As suggested by Ozawa and Sripad [44], this challenge could be managed by further research using a qualitative methodology to explore the nature and characteristics of satisfaction. Another explanation is that there are other factors not identified in this study that might impact the relationship between satisfaction and response time. Another limitation of this study is that the personal experience of fire is not known in the dataset used in this study. However, it is known that personal experience of fire has been associated with an increased level of protection [45, 46]. In this particular case, it is important to emphasise that this study does not claim causality but aims to show a relationship between satisfaction and response times, thereby encouraging further research.

7 | Conclusions

This study identifies a link between rescue service response times and satisfaction levels, with the organisational form of the rescue services acting as a moderator. It also finds a relationship between response times, satisfaction, and the likelihood of individuals owning fire protection equipment. Most importantly, the results point to real-world challenges in how to structure rescue services in the future. However, the results need to be interpreted cautiously as the regression model explains only 6% of the variation, suggesting that factors not identified in this study might influence individual satisfaction with rescue services. This points towards the fact that more research is needed to further explore reasoning and motivation among individuals owning or not owning fire safety equipment. For example, a future study could be designed qualitatively and focus on interviewing individuals for a deeper understanding of reasoning and sense-making related to safety behaviour related to perceived confidence in public actors.

The results indicate that individuals behave rationally based on the conception that if one expects help to arrive within a certain time frame, then the incentive to take individual safety measures may be lower compared to those who think that help cannot arrive in a timely manner to put out the fire. These results might indicate that if municipalities are unable to maintain fast full-time organisations, part-time services may be preferable for upholding and increasing citizen satisfaction.

Funding

This work was supported by the Brandforsk (223-001).

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available in Statistics Sweden at https://www.scb.se/vara-tjanster/index/, and the Swedish Civil Contingencies Agency at https://www.msb.se/en/referencenumberMSB2246.

References

1. F. Nilson, "The Residential Fire Injury Pyramid," in *Residential Fire Safety: An Interdisciplinary Approach*, ed. M. Runefors, R. Andersson, M. Delin, and T. Gell (Springer International Publishing, 2022), 29–43.

2. S. W. Gilbert and D. T. Butry, "Identifying Vulnerable Populations to Death and Injuries From Residential Fires," *Injury Prevention* 24 (2018): 358–364.

3. M. Runefors, N. Johansson, and P. Van Hees, "How Could the Fire Fatalities Have Been Prevented? An Analysis of 144 Cases During 2011–2014 in Sweden: An Analysis," *Journal of Fire Sciences* 34 (2016): 515–527.

4. A. Jonsson, C. Bonander, F. Nilson, and F. Huss, "The State of the Residential Fire Fatality Problem in Sweden: Epidemiology, Risk Factors, and Event Typologies," *Journal of Safety Research* 62 (2017): 89–100.

5. A. Jonsson and H. Jaldell, "Identifying Sociodemographic Risk Factors Associated With Residential Fire Fatalities: A Matched Case Control Study," *Injury Prevention* 26 (2019): 147–152.

6. S. W. Marshall, C. W. Runyan, S. I. Bangdiwala, M. A. Linzer, J. J. Sacks, and J. D. Butts, "Fatal Residential Fires: Who Dies and Who Survives?," *JAMA* 279 (1998): 1633–1637.

7. M. Duncanson, A. Woodward, and P. Reid, "Socioeconomic Deprivation and Fatal Unintentional Domestic Fire Incidents in New Zealand 1993–1998," *Fire Safety Journal* 37 (2002): 165–179.

8. J. E. Ballard, T. D. Koepsell, and F. Rivara, “Association of Smoking and Alcohol Drinking With Residential Fire Injuries,” *American Journal of Epidemiology* 135 (1992): 26–34.

9. L. Xiong, D. Bruck, and M. Ball, “Comparative Investigation of ‘Survival’ and Fatality Factors in Accidental Residential Fires,” *Fire Safety Journal* 73 (2015): 37–47.

10. F. Nilson, C. Bonander, and A. Jonsson, “Differences in Determinants Amongst Individuals Reporting Residential Fires in Sweden: Results From a Cross-Sectional Study,” *Fire Technology* 51 (2015): 615–626, https://doi.org/10.1007/s10694-015-0459-0.

11. F. Nilson and C. Bonander, “Societal Protection and Population Vulnerability: Key Factors in Explaining Community-Level Variation in Fatal Fires Involving Older Adults in Sweden,” *Fire Technology* 57 (2021): 247–260.

12. H. Frantzich, N. Johansson, M. McNamee, et al., *Effektivitet inom räddningstjänsten: nya risker kräver nya tvärvetenskapliga lösningar [Efficiency in the rescue service: new risks require new interdisciplinary solutions]*, Report for Myndigheten för samhällsskydd och beredskap [*The Swedish Civil Contingencies Agency*]. Report no. MSB1442 (Lund University; Karlstad University, 2019).

13. M. Runefors, “Measuring the Capabilities of the Swedish Fire Service to Save Lives in Residential Fires,” *Fire Technology* 56 (2020): 583–603.

14. H. Jaldell, “How Important is the Time Factor? Saving Lives Using Fire and Rescue Services,” *Fire Technology* 53 (2015): 695–708.

15. M. Kobes and R. Van Den Dikkenberg, “An Analysis of Residential Building Fire Rescues: The Difference Between Fatan and Nonfatal Casualties,” In *Proceedings of the 14th International Fire Science and Engineering Conference Interflam* (2016), 353–365.

16. B. Mattsson and B. Juås, “The Importance of the Time Factor in Fire and Rescue Service Operations in Sweden,” *Accident; Analysis and Prevention* 29 (1997): 849–857.

17. F. Nilson, “Den kommunala räddningstjänstens arbete i det förändrade samhället [The work of the municipal rescue service in the changed society],” in *Effektivitet inom räddningstjänsten –nya risker kräver nya tvärvetenskapliga lösningar [Effiency in the emergency services – new risks require new interdisciplinary solutions]*, Report for Myndigheten för samhällsskydd och beredskap [The Swedish Civil Contingencies Agency]. Report no. MSB1442, ed. H. Frantzich, N. Johansson, M. McNamee, et al. (Lund University; Karlstad University, 2019).

18. P. Sandin and M. Wester, “Etik, ansvar och fördelningsprinciper i brandskydd [Firefighting ethics: princples for burning issues],” Report, Brandforsk, September 2010.

19. P. G. Almklov, M. Nilsen, and G. Gjøsund, “Role Multiplexity and Home-Grown Resilience: A Study of Part-Time Firefighters in Rural Emergency Management,” in *Safety and Reliability: Safe Societies in a Changing World*, ed. S. Haugen, A. Barros, C. Gulijk, T. Kongsvik, and J. E. Vinnem (CRC Press, 2018), 189–196.

20. K. F. Licht and B. Brülde, “On Defining “Reliance” and “Trust”: Purposes, Conditions of Adequacy, and New Definitions,” *Philosophia* 49 (2021): 1981–2001.

21. A. J. I. Jones, “On the Concept of Trust,” *Decision Support Systems* 33 (2002): 225–232.

22. M. Siegrist, “Trust and Risk Perception: A Critical Review of the Literature,” *Risk Analysis* 41 (2021): 480–490.

23. J. A. Hamm, J. Lee, R. Trinkner, T. Wingrove, S. Leben, and C. Breuer, “On the Cross-Domain Scholarship of Trust in the Institutional Context,” in *Interdisciplinary Perspectives in Trust: Towards Theoretical and Methodological Integration*, ed. E. Schockley, T. M. S. Neal, L. M. PytlikZillig, and B. H. Bornstein (Springer, 2016), 131–156.

24. T. Christensen and P. Lægreid, “TRUST IN GOVERNMENT: The Relative Importance of Service Satisfaction, Political Factors, and Demography,” *Public Performance & Management Review* 28 (2005): 487–511.

25. F. Nilson and A. Mankell, “Is the Percieved Risk of Fire-Related Injury and Trust in Local Authorities Affected by Rescue Services' Actual Ability?,” *Preventive Medicine Reports* 30 (2022): 102030.

26. SCB, “Rapportbilaga: SCBs medborgarundersökning 2019 [Report appendix: Statistics Sweden's citizen survey 2019],” 2019.

27. SCB, “Medborgarundersökningen del b: Medborgarnas syn på kommunens verksamheter efter kommun och kön: År 2010–2020 [Citizen survey part b: Citizens' view of the municipality's activities and gender: Year 2010–2020],” https://www.statistikdatabasen.scb.se/pxweb/sv/ssd/START__ME__ME0003/Medborgarenb/.

28. J. F. Ludvigsson, P. Otterblad-Olausson, B. U. Pettersson, and A. Ekbom, “The Swedish Personal Identity Number: Possibilities and Pitfalls in Healthcare and Medical Research,” *European Journal of Epidemiology* 24 (2009): 659–667, https://doi.org/10.1007/s10654-009-9350-y.

29. SCB n.n, “Samordning av Sveriges officiella statistik [Coordination of Sweden's official statistics],” https://www.scb.se/om-scb/samordning-av-sveriges-officiella-statistik/.

30. SCB n.n, “Antal personer med utländsk eller svensk bakgrund (grov indelning) efter region, ålder och kön. År 2002–2024. [Number of people with a foreign or Swedish background (rough division) by region, age and gender. Years 2002–2024]”.

31. SCB n.n, “Indikatorer inkomstfördelning efter region. År 2011–2023 [Income distribution indicators by region. Years 2011–2023.]”.

32. MSB, “Brand-och brandskyddsundersökningen 2022: Resultat och jämförelse med tidigare år [The fire and fire safety survey 2022: Results and comparison with previous years]. Report, *Myndigheten för samhällsskydd och beredskap* [*The Swedish Civil Contingencies Agency*], Karlstad, October,” 2023.

33. C. Rådestad and O. Larsson, “Responsibilization in Contemporary Swedish Crisis Management: Expanding ‘Bare Life’ Biopolitics Through Exceptionalism and Neoliberal Governmentality,” *Critical Policy Studies* 14 (2020): 86–105.

34. G. Wachinger, O. Renn, C. Begg, and C. Kuhlicke, “The Risk Perception Paradox – Implications for Governance and Communication of Natural Hazards,” *Risk Analysis* 33 (2013): 1049–1065.

35. D. A. Ward, M. C. Stafford, and L. N. Gray, “Rational Choice, Deterrence, and Theoretical Integration,” *Journal of Applied Social Psychology* 36 (2006): 571–585.

36. A. Kaasa and L. Andriani, “Determinants of Institutional Trust: The Role of Cultural Context,” *Journal of Institutional Economics* 18 (2022): 45–65.

37. G. Ó. Erlingsson, “A Stranger Thing? Sweden as the Upside Down of Multilevel Trust,” *JTR* 11 (2021): 22–41.

38. G. Bouckaert and S. de Van Walle, “Comparing Measures of Citizen Trust and User Satisfaction as Indicators of ‘Good Governance’: Difficulties in Linking Trust and Satisfaction Indicators,” *International Review of Administrative Sciences* 69 (2003): 329–343.

39. M. Ahrens, *Smoke Alarms in US Home Fires*, Report (NFPA Research, 2021).

40. W. Shields, E. Omaki, J. Villalba, and A. Gielen, “It is not the Batteries! Smoke Alarm Presence and Functionality 5 to 7 Years Postinstallation of Sealed Lithium Battery Alarms,” *Journal of Burn Care & Research* 43 (2022): 1135–1139.

41. G. Zhang, A. H. Lee, H. C. Lee, and M. Clinton, “Fire Safety Among the Elderly in Western Australia,” *Fire Safety Journal* 41 (2006): 57–61.

42. C. DiGuiseppi, I. Roberts, A. Wade, et al., “Incidence of Fires and Related Injuries After Giving out Free Smoke Alarms: Cluster Randomised Controlled Trial,” *BMJ* 325 (2002): 995–997.

43. D. Kendrick, C. Mulvaney, and M. Watson, “Does Targeting Injury Prevention Towards Families in Disadvantaged Areas Reduce Inequalities in Safety Practices?,” *Health Education Research* 24 (2009): 32–41.

44. S. Ozawa and P. Sripad, “How Do You Measure Trust in the Health System? A Systematic Review of the Literature,” *Social Science & Medicine* 91 (2013): 10–14.

45. V. Allareddy, C. Peek-Asa, J. Yang, and C. Zwerling, “Risk Factors for Rural Residential Fires,” *Journal of Rural Health* 23 (2007): 264–269.

46. K. Stumpf, D. Knuth, D. Kietzmann, and S. Schmidt, “Adoption of Fire Prevention Measures – Predictors in a Representative German Sample,” *Safety Science* 94 (2017): 94–102.