CONTEXT-SPECIFIC MEASURES OF CCTV EFFECTIVENESS IN THE RETAIL SECTOR

by

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Abstract: *This study reports a research project that explored the effectiveness of closed circuit television (CCTV) as a primary crime prevention measure directed against staff and customer theft in the retail clothing sector. It demonstrates the usefulness of a strong before-and-after research design, as well as the benefits of using different measures for different purposes, including loss measured as a percentage of sales, loss by number of units stolen and loss by value. The study also examines whether the costs of CCTV installations are offset by the benefits of reduced loss. It is concluded that robust measures that are "fit for a purpose" allow informed choices to be made about appropriate investment in crime prevention CCTV technology.*

RETAIL CRIME THREATS

The retail sector is one of the largest and most dynamic parts of the United Kingdom's economy (O'Brien and Harris, 1991; Cahill, 1994; Guy, 1994). By the mid-1990s the industry had a turnover of £187 billion, or 14% of the nation's gross domestic product, and it employed 2.4 million persons, or 10% of the British workforce, in some 328,000 retail outlets (Burrows and Speed, 1994; U.K. House of Commons, 1994; Beck and Willis, 1995; Wells and Dryer, 1997).

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Growing concern about crime threats to retailing led to the establishment of the Retail Crime Initiative by the British Retail Consortium (BRC). From 1994 there has been an annual report on retail crime and its costs. The survey for the financial year 1995-96 was based on 48,000 U.K. retail outlets with a combined turnover of over one-half of all retail sales (Wells and Dryer, 1997).

The study revealed 5.3 million criminal incidents in the course of a year — the equivalent of 18 offences per outlet. The total annual costs of retail crime were estimated to be £1.9 billion — £1.4 billion sustained as a result of known or suspected criminal incidents, and a further £450 million of expenditure on security hardware and security services. Against annual sales of £187 billion, this was equivalent to 1.13% of total retail turnover. Crime costs amounted to an average loss of £85 from each household in the country.

Customer theft and staff dishonesty dominated retail crime figures. Retailers witnessed, or could quite clearly establish, 5 million instances of customer theft, with 1.6 million offenders apprehended and just over 1 million referred to the police. The gross loss due to customer theft was estimated to be £653 million — £211 million lost due to witnessed incidents and £442 million lost to unwitnessed crimes. The findings are similar to those of a 1993 U.K. Home Office study that identified 5.8 million instances of customer theft, with witnessed incidents accounting for losses of £200 million (Mirrlees-Black and Ross, 1995). The BRC survey also found over 31,000 recorded incidents of staff theft or fraud, involving nearly 20,000 staff of whom 40% were referred to the police. The value of staff theft recorded by stores was £386 million, £39 million derived from witnessed incidents (detected cases) and £347 million attributed to unwitnessed staff thefts (suspected cases).

Findings for the fashion retail sector reflected the broader picture. The BRC survey identified 30,000 outlets with an annual turnover of £19 billion that suffered criminal losses of £128 million, with a further £74 million spent on crime prevention measures. Against annual sales of £19.3 billion, this was equivalent to 1.05% of total clothing retail turnover. Over three-quarters of all losses were attributed to just two offence categories — customer theft at £53 million (41%) and staff theft at £47 million (37%). Earlier retail crime surveys pointed to near-identical findings (Bamfield, 1994; Burrows and Speed, 1994; Forum of Private Business, 1995; Mirrlees-Black and Ross, 1995; Speed et al., 1995), and related studies have also highlighted the extent and costs of retail crime (Ekblom, 1986; U.K. Home Office, 1986;

Ekblom and Simon, 1988; Touche Ross, 1989, 1992; Hibberd and Shapland, 1993; Beck and Willis, 1995).

The data are unequivocal — the criminal threat to the retailer in general, and the fashion retailer in particular, is substantial whether this is measured by the number of incidents or the direct costs of stock loss. There are also consequential costs caused by disruption to trade and taking remedial action, including instituting security measures. All of these costs have to be borne, either by retailers in the form of lowered profits, by the customers in the form of increased prices, or by both. Finally, most of this victimisation remains well outside the purview of the formal authorities; of the 5 million instances of retailer-identified thefts a year only 280,000 offences, or 6% of the total, are recorded as police crime statistics (U.K. Home Office, 1996a; Wells and Dryer, 1997). There is a crime detection deficit, and even when offenders are known, they are not necessarily passed on to the police. These shortfalls suggest that crime prevention initiatives need to be directed at the point where crimes are committed (individual stores) and focused on the problems of customer theft and staff dishonesty. It is at this point that CCTV commends itself as a suitable mechanism.

GROWTH OF CCTV

There is evidence that rising retail crime threats are increasingly being met by the installation and use of security surveillance equipment. All the indicators point towards substantial and continuing growth in the CCTV market. Surveillance cameras are now found in a "bewildering variety* of settings (Honess and Charman, 1992) and are seen as a common feature of public life. In a three-year period from 1994, government has provided £35 million for 350 CCTV installations, mostly in town centres (U.K. Home Office, 1996b). Beck and Willis (1995) estimate that over £300 million a year is spent on video surveillance equipment, with around 300,000 security cameras being sold, and that more than a million may be in use. More specifically, the retail sector accounts for the largest proportion of capital expenditure with over one-third of the total spend (36%), followed by the industrial sector (31%), the commercial sector (17%) and the public sector (16%).

The BRC survey confirms the prominent position of CCTV in the retail environment (Wells and Dryer, 1997). Total crime prevention costs in 1995-96 amounted to £450 million, of which £74 million or 16% was CCTV-related — £54 million capital expenditure on CCTV

installations and £20 million on equipment maintenance and monitoring. Earlier sweeps of the survey showed even higher levels of spending — £133 million in 1993-94 and £119 million in 1994-95. In the three-year period from 1993-94 to 1995-96, a total of £326 million was spent on security surveillance in the retail sector. The prominent position of CCTV in retail crime prevention was confirmed by U.K. Home Office research (Mirrlees-Black and Ross, 1995). CCTV was found to be present in 20% of all retail outlets and 36% of the larger outlets; its installation being positively correlated with previous victimisation and a known crime problem. It is clearly being used as a principal weapon in the fight against shop crime.

This enthusiasm for CCTV is buttressed by a number of recurring themes (Beck and Willis, 1995). CCTV supposedly offers a technological equivalent to extensive police or security surveillance, a case of the officer on the beat or security guard being replaced by an omnipresent, near-infallible robot eye in the sky on duty 24 hours a day. It offers day-and-night surveillance, with an unparalleled capacity to deter or to detect the offender. Electronic surveillance promises comprehensive crime control in a neat, high-technology package — an off-the-shelf, state-of-the-art, electronic panacea for crime. There is a seductive appeal to what might be called the "high-tech fix." There is a danger, however, that commitment to (and expenditure on) CCTV, in both the public and private sectors, may be more a matter of "security wish fulfillment" than a judgement based on hard evidence and a reasoned assessment of its effectiveness. CCTV may be receiving a vote of confidence primarily because everyone wants to believe in its effectiveness rather than because its effectiveness has been demonstrated. It may be easier and more convenient to show blind faith in its supposed capabilities than to assess properly its contribution to crime control. To some extent the "hunches' that inform decisions to install CCTV systems are largely a product of a needs-led belief that there is (at long last) a techno-fix solution that guarantees real-life, crime control benefits, but this is far from an evidence-led assessment of its contribution to crime prevention.

In its strongest form, an uncritical belief in CCTV's effectiveness could operate so as to preclude any formal assessment of its merits; and efficacy becomes a presumption that follows from installation. Equally, there can be technical reasons why CCTV remains under-researched or poorly researched (Ekblom and Pease, 1995; Tilley, 1997). Finally, Beck and Willis (1995) have pointed to a raft of unanswered questions about its impact in relation to: the detection of offenders; the deterrence of would-be offenders; the contribution to

crime control of displacing criminal activities elsewhere; the relative usefulness of video recordings and real-time images; the ability of operators to monitor and make sense of multiple images; the impact on customers (who may be reassured even when there are no measurable benefits); and the effect on shop staff (who may become less vigilant about crime following its installation). These point to the need for high-quality data, which is seen to be in short supply (Edwards and Tilley, 1994).

Tilley (1997) goes rather further by suggesting that the question "Does CCTV work?" is not susceptible to any consistent answer either because of technically weak evaluations or because different systems will have differential impacts, which implies that the question itself is not "sensible, useful or intelligible" (p. 179). This is too pessimistic, however, because the author promptly proceeds to offer a new approach, called realistic evaluation, that seeks to establish what works for whom and in what circumstances, where CCTV's effectiveness is seen as a "range of outcomes...generated through mechanisms triggered in context" (Tilley, 1997:183; see also Pawson and Tilley, 1994, 1997). What is really being asserted here is the need to establish how CCTV works in defined settings so as to produce particular outcomes.

These reasonable precepts can be applied to the evaluation of CCTV in the fashion retail sector, where outcomes or measures of effectiveness can be understood as the product of the deployment of CCTV in a specific context (fashion stores) for a particular purpose. The critical variable is the purpose for which CCTV is installed, and there are major differences here between the interests of the academic researcher and those of the retailer. The former may wish to explore subtle differences between CCTV's impact on detection or its deterrent effect, or its effect on customer confidence and the fear of crime. The latter has a more straightforward agenda — namely, the effect of CCTV on the store's ability to make money; under normal circumstances the "bottom line" is the "bottom line." This may be none too elegant but it reflects commercial realities. It is a solid enough imperative from the retailer's point of view, and it gives the researcher a clear enough agenda for evaluation, especially with the use of an experimental design.

The research question focuses, therefore, on whether CCTV is fit for the purpose of reducing loss to the point where its costs are more than offset by a reduction of loss due to its deployment. Again, this stands in contrast to Tilley's (1997) suggestion that there will "rarely if ever be sufficient data to assess the full costs and benefits that can be directly attributable to CCTV" (p. 182), but this is to misunder-

stand the realities of business life. Where the prospect of maximising financial advantage is threatened by crime (stock loss caused by customer theft or staff theft) it is an absolute business imperative — and a straightforward empirical question — as to whether the costs of installing CCTV can be compensated for by reduced stock loss equal to (or greater than) the crime prevention initiative. This is an everyday commercial calculation of the same order as, for example, whether an investment in product advertisement generates additional sales over and above the costs of the publicity.

METHODOLOGY

The aim of the project was to measure the impact of different types of CCTV systems on levels of loss, including its performance over time, and to assess whether its costs were more than compensated for by crime control benefits. The project was carried out in 15 stores operated by a large U.K. fashion retailer with over 180 branches nationwide. All the stores were located in similar retailing environments. Three different types of CCTV systems were installed, each with varying degrees of sophistication. Three stores had a high-level system with between two and four pan, tilt and zoom colour cameras; between eight and 12 static colour cameras; public monitors positioned at all customer entrances; the facility to record; and security staff monitoring the system at all times. The average cost of installing a high-level system was £24,000. Six stores had a medium-level system with between six and 12 static colour cameras, public monitors at each customer entrance, the facility to record, but with monitoring carried out by the store manager from his or her office when time permitted. The average cost of installing a medium level system was £14,000. The remaining six stores had a low-level system with up to 12 dummy cameras, public monitors at all entrances but no facility to record. The average cost of installing a low-level system was £4,000. The terms high-level, medium-level and low-level are used below to refer to stores with these systems. Members of staff in all the stores were given training on how to use the system prior to the research, and all the equipment was in full working order throughout the study period.

The research used a before-and-after experimental design. Prior to the installation of CCTV, a stocktake was carried out in each of the stores to measure the amount lost as a percentage of sales, the number of units stolen and their value. This process was repeated 13 weeks after installation (3 months) and then again after 28 weeks (6

months). Whilst every effort was made to keep strict control over the way in which the stocktakes were carried out, the project had to rely upon the staff within the stores to perform the data collection process. Although the stocktake assessment of loss is an incomplete and imperfect indicator because it fails to discriminate between stock loss due to customer theft and staff theft, as well as failing to distinguish non-criminal, accidental shrinkage of product, it is the method of first choice throughout the retail sector. Although it could be argued that this approach needs refining, it is difficult to see how loss could be assessed other than by some means of checking stock held against stock sold.

EFFECTIVENESS OF CCTV

The primary mechanism for measuring loss is to calculate the value of goods lost expressed as a percentage of all goods sold, in this case before the installation of CCTV and then at a point some three and six months later (Table 1). Within three months of the installation of CCTV, the figures for loss to sales went down from 2.45% to 1.97% for all stores, with a reduction from 1.96% to 1.62% per cent in high-level stores, from 2.53% to 2.03% in medium-level stores, and from 3.08% to 2.38% in low-level stores. The percentage change in stock loss reduction over this three-month period was greatest for stores with low-level CCTV installations (23%), followed by those with medium-level systems (20%) and then those with a high-level specification (17%). The installation of CCTV had a dramatic effect on the levels of stock loss, showing an immediate improvement of 20% overall, with marginally greater improvements in low-level compared with high-level stores.

Findings from the second stocktake, six months after CCTV installation, were much more mixed. Using adjusted figures because only 10 stores completed the experiment in full, the figures for loss to sales over six months remained unchanged at 2.25% for all stores, with an increase from 1.96% to 2.70% in high-level stores, a reduction from 2.40% to 1.97% in medium-level stores, and a reduction from 2.63% to 1.93% in low-level stores.

The percentage change in stock loss reduction over the six-month period was greatest for stores with low-level CCTV installations (27%) followed by those with medium-level systems (18%), suggesting that the initial improvement was being maintained at or above the rates achieved after the three-month stocktake. In contrast, there was a substantial increase in the stock loss to sales figure over the six-

month period for stores with high-level CCTV installations (38%). This had the effect of wiping out the initial impact of CCTV across all stores, and the overall percentage of loss to sales figure returned to the pre-installation level.

Table 1: Stock Loss to Sales Before and After CCTV Installation by Type of System

Type of system	Percent stock loss to sales				Percent stock loss reduction from installation	
	Pre-CCTV†	After 3 months	Pre-CCTV††	After 6 months	After 3 months	After 6 months
High	1.96	1.62	1.96	2.70	17.3	37.8
Medium	2.53	2.03	2.40	1.97	19.8	17.9
Low	3.08	2.38	2.63	1.93	22.7	26.6
All	2.45	1.97	2.25	2.25	19.6	0.0

† Base figure derived from 15 stores with complete stocktake.

†† Adjusted base figure derived from 10 stores with complete stocktake and 2 stores with partial stocktake.

Whilst the percentage of loss to sales is the usual way of measuring the rate of loss in retailing, another (widely used) option is to compare the number of units stolen, together with their value, before and after installation. Table 2 presents data covering the three-month experimental period, and Table 3 presents findings obtained over the six-month experimental period, in both cases using the average losses over a one-week period.

Within three months of the installation of CCTV the average number of units lost had fallen from 72 to 52 for all stores — with a reduction from 166 to 100 units in high-level stores, from 54 to 45 units in medium-level stores, and from 44 to 35 units in low-level stores. The corresponding figures for loss by value showed an overall reduction from £900 to £650 for all stores — with a reduction from £2,075 to £1,250 in high-level stores, from £675 to £562 in medium-level stores, and from £550 to £438 in low-level stores. The installation of CCTV had a dramatic effect on the level of stock loss, which was lowered by 28% for all stores — with a reduction of 40% in high-level stores, 17% in medium-level stores and 20% in low-level stores.

Table 2: Average Number and Value of Stock Units Lost Per Week Before CCTV Installation and After Three Months by Type of System

Type of System	Pre-CCTV		After 3 months		Percent reduction in loss
	Average number lost	Average value lost (£)†	Average number lost	Average value lost (£)†	
High	166	2,075	100	1,250	39.8
Medium	54	675	45	562	16.7
Low	44	550	35	438	20.4
All	72	900	52	650	27.7

†Following company procedures, the value of loss is calculated on the basis of £12.50 per unit lost.

Table 3: Average Number and Value of Stock Units Lost Per Week Before CCTV Installation and After Six Months by Type of System

Type of system	Pre-CCTV		After 6 months		Percent reduction in loss
	Average number lost	Average value lost (£)††	Average number lost	Average value lost (£)††	
High	123	1,538	91	1,138	26.0
Medium	44	550	58	725	31.8
Low	44	550	48	600	9.1
All	64	800	63	788	1.6

†Adjusted base figure derived from 9 stores with complete stocktake and 3 stores with partial stocktake.

††Following company procedures, the value of loss is calculated on the basis of £12.50 per unit lost.

Within six months of the installation of CCTV, the average number of units lost had fallen from 64 to just 63 for all stores — with a reduction from 123 to 91 units in high-level stores, together with a rise from 44 to 58 units in medium-level stores and a rise from 44 to 48

units in low-level stores. The corresponding figures for loss by value showed only a marginal reduction, from £800 to £788 for all stores — with a marked reduction from £1,538 to £1,138 in high-level stores, together with an increase from £550 to £725 in medium-level stores and an increase from £550 to £600 in low-level stores. The short-term impact of CCTV on the overall level of stock loss had all but disappeared, with a reduction of a little more than 1% for all stores. However, high-level stores showed an impressive reduction of 26%, whilst there was an increase of 32% in medium-level stores and an increase of 9% in low-level stores.

The decision to install CCTV in part reflects a commercial judgement about whether it offers value for the money, in this case, a calculation about the expected payback period or the time it would take to recover the cost of the equipment based upon the savings made in the amount that would have been lost to theft. Table 4 summarizes the data on the average weekly reduction in loss compared with the rate prior to installation, the cost of installing the equipment in the experimental stores, and the number of weeks required to pay back the initial cost of installation.

Table 4: Average Weekly Reduction in Stock Loss, Cost of CCTV Installation and Estimated PayBack Period by Type of System

Type of System	Average weekly reduction per store (£)		Cost of installation (£,000)	Estimated payback period (Years)	
	After 3 months	After 6 months		After 3 months	After 6 months
High	371	178	24	1.2	2.6
Medium	52	nil	14	5.2	Never
Low	53	nil	4	1.5	Never
All	116	4	12	2.0	57.6

Three months after the installation of CCTV the average weekly reduction in loss for all stores was £116, which, given average capital expenditure of £12,000 per CCTV system, would mean that it would take two years (103 weeks) to recoup the capital costs of its installation. There was considerable variation in the payback period for the different types of systems. For high-level systems with an average weekly reduction in loss of £371 set against a capital expenditure of

£24,000, the payback period was just over one year (65 weeks). For medium-level systems with an average weekly reduction in loss of only £52 set against capital expenditure of £14,000, the payback period was just over five years (269 weeks), Finally, for low-level systems with an average weekly reduction in loss of just £53 set against a capital expenditure of £4,000, the payback period was one and one-half years (75 weeks).

Like the other measures of loss outlined above, the impact of CCTV was reduced significantly by the time of the second stocktake. Six months after installation the average weekly reduction in loss for all stores was a near-insignificant £4, which, given average capital expenditure of £12,000 per CCTV system, would mean that it would take 58 years to recoup the capital costs of its installation. There was considerable variation in the payback period for the different types of systems. For high-level systems with an average weekly reduction in loss of £178 set against a capital expenditure of £24,000, the payback period was now 2.6 years (135 weeks). For medium and low-level systems, however, the payback period was nonexistent; it could not be calculated because the average weekly reduction in loss had disappeared altogether.

DISCUSSION

The pre-CCTV loss to sales figure of 2.45% was rather larger than that found in the 1995-96 BRC retail crime survey of 1.13% for the whole sector and 1.05% for the clothing sector (Wells and Dryer, 1997), but high-fashion stores may well be more at risk than other outlets. The change in the loss to sales figures over three months (from 2.45% to 1.97% for all stores) represented a 20% reduction in loss, although the low base rate makes extravagant claims about percentage change somewhat suspect. This initial success was maintained in low-level (27%) and medium-level (18%) stores, but high-level stores witnessed a 38% increase in the loss to sales figures over six months.

The corresponding three-month figures for losses by number were impressive, with the average number of units stolen in a week down from 72 to 52, together with a reduction by value from £900 to £650 — a decrease of 28% overall. The six-month figures for losses by number were altogether less impressive, with the average number of units stolen in a week barely changing from 64 to 63, together with a marginal reduction by value from £800 to £788 — a decrease of rather more than 1% overall. Within these figures there was contin-

ued success for CCTV in high-level stores with a 26% reduction, although medium-level stores showed an increase in loss of 32% and low-level stores showed an increase in loss of 9%.

The first observation is that the introduction of CCTV was associated with a significant short-term decrease in loss whether this was calculated as loss to sales, the number of units lost or their value. The three measures point towards the same conclusion, but they fail to explain the mechanism that accounts for the change (Tilley, 1997). However, it is most likely that the mechanism increases would-be offenders' fears that the system would lead to enhanced prospects for detection and apprehension, thereby acting as a deterrent to crime. One interpretation would view the theft of fashion items (which are small, easily portable and of relatively high value) as a classic case of opportunistic offending — something that is usually held to include one or more of three factors: high enticement to commit crime or the attraction of unpaid-for product; material conditions that are conducive to crime or ease of access; and benefits that can be obtained at minimal risk with low prospects of detection (see Clarke, 1980; Hough et ah, 1980; Poyner, 1983; Felson, 1994, 1996; Lab, 1997).

Equally, even where shop theft is interpreted as the product of an instrumental and considered approach in making a rational choice to engage in offending behaviour (Wilson, 1975; Cornish and Clarke, 1986), the low rates of apprehension and referral to the police suggest that the shop-wise offender will readily calculate that the stealing-with-success odds are very much in his or her favour. Data from the BRC's crime survey show that of five million offences witnessed or experienced by retailers, only around one million were referred to the police and fewer than 276,000 were recorded by the police (Wells and Dryer, 1997). The large attrition between known offending and formal action suggests that theft is the product of a reasoned decision that the likely costs (detection) are more than compensated for by the likely benefits (the value of stolen product). Again, the introduction of CCTV would operate as a deterrent by increasing the potential offenders' perceptions of the likelihood of being detected. The findings over the three-month experimental period support the use of CCTV for deterrent purposes, whether shop theft is interpreted as a function of opportunity or rational choice. This reflects an earlier interpretation by Tilley (1993) that CCTV impinges more on risk-perception mechanisms than it does on rates of detection and conviction (see also Pawson and Tilley, 1997).

Critics will rightly suggest that the model of the all-knowing, fully informed and all-thinking offender, spending much of his or her time

calculating the criminal odds, does not reflect the reality of offending behaviour. The concept of the "reasoning criminal" (Cornish and Clarke, 1986) can, however, be reconstituted in terms of a weaker form of rationality — something often referred to as "bounded rationality" or "limited rationality" (Newman, 1997; Opp, 1997). This approach recognises the complexity of factors (social, environmental and cognitive) that influence and shape behaviour. In the retail context, it is likely that the "decision" to offend or not is the product of an interaction between an overall setting that actively encourages criminal behaviour and features within it that act as disincentives to crime (see Wortley, 1997). The retail environment can be seen as a near-perfect example of a crime-encouraging situation, where ease of access to highly desirable product is deliberately engineered — a form of structured enticement, preferably to shop but possibly to steal. Against this, CCTV can be seen as a crime-discouraging behavioural prompt — a visible cue or reminder that "guardianship" is actively present. Although it is unlikely that would-be offenders constantly calculate the likely rewards of crime against its costs, it is highly plausible that CCTV (cameras, monitors and signage) acts as an occasional situational prompt that encourages rationality in coming to a decision about whether or not to commit crime.

The second major observation is that the effectiveness of CCTV had largely disappeared by the six-month point. Using the figures for the number of units lost and their value, although high-level stores showed a decrease in loss (26%) this was wiped out overall because of an increased loss in medium-level (32%) and low-level (9%) stores. In contrast, the figures for loss expressed as a percentage of sales showed an increase for high-level stores (38%), with decreases for medium-level (18%) and low-level (27%) stores. Although the data do not offer a consistent picture, it is worth exploring the possible reasons for success and failure. The explanation for continuing success (decreased loss) is straightforward: would-be offenders are inhibited by the potential that CCTV poses for increased detection, thereby securing a deterrent effect. The explanation for success not being sustained (decreased loss giving way to increased loss) is more problematic, but a likely mechanism is that would-be offenders become progressively inured or desensitised to CCTV's deterrent potential.

It is well-established that CCTV operators can be subject to so-called video blindness, wherein they fail to take in information from a number of screens in a way that allows them to analyse and react to images that give grounds for concern (Broadbent, 1958; Edwards and Tilley, 1994: Beck and Willis, 1995). It is equally possible that newly

installed CCTV systems command the attention and respect of would-be offenders (with deterrent impact), but that familiarity over time leads to the equipment becoming a taken-for-granted, routinised part of the retail environment (with diminished deterrent impact). This is consistent with the "bounded" or "limited" perspective on rational choice in offending behaviour (see Newman et al., 1997) where long-term exposure to rationality-enhancing and crime-discouraging environmental prompts (such as CCTV) can lead to inhibition satiation — a case of over-familiarity breeding contempt. This is reflected by the data on loss by number of units and value (see Table 3), where there was continuing effectiveness for high-level systems, which had security staff monitoring the equipment at all times, and diminishing effectiveness for both medium-level systems with occasional monitoring and low-level systems with dummy cameras.

To the extent that the lack of long-term effectiveness is a product of familiarity over time leading to a reduction in deterrence, the crime prevention implications would appear to centre on giving CCTV a high profile and then on maintaining it. Just as retailers routinely redesign the shopping environment in the interests of keeping the honest shopper attracted to product, the security manager may need to consider a similar approach to CCTV in the interests of reminding potential offenders of the in-store security system. At a minimum, this would suggest that CCTV signage should be changed regularly, but it could also include moving the cameras and monitors themselves, or even taking them out and replacing them with new equipment. In each case, the emphasis would be on highlighting the presence of security hardware — and its operators — in order to maximise its deterrent effect. Pawson and Tilley (1997) refer to this as emphasising the "publicity" mechanism associated with CCTV.

Diminishing effectiveness over time could also be a product of an uncritical acceptance of the crime-control attributes of CCTV by in-store sales and security personnel, leading to a relaxation in staff vigilance. Staff may presume that CCTV is making a major contribution to the detection or deterrence of offenders, perhaps in the mistaken belief that it offers a technological panacea for the problem of crime. If they believe that security hardware is a primary factor in crime prevention, this could result in an overreliance on an impersonal, high-tech approach to security. There is some danger that staff could see themselves as being absolved from security responsibilities. As the authors have argued previously, CCTV may be "a double-edged sword where any crime control benefits need to be set against the possible costs of lower levels of staff vigilance" (Beck and Willis,

1995:190). A Home Office guide is also alert to the possibility of CCTV inadvertently producing an "exaggerated sense of security" (Edwards and Tilley, 1994:15). There is a possibility that the introduction of CCTV may cause feelings of security to go up but in the process cause staff feelings of responsibility for crime prevention to go down; a scenario with obvious implications for staff training. The ways in which the impact of security equipment is mediated by the person-centred activities of sales and security staff is a relatively under-explored area.

There is a interesting irony that where the introduction of CCTV can cause store staff to "switch off leading to a reduction in security, its use may reassure members of the shopping public even where there are no measurable security advantages. There is some strength in the point that it does not matter a great deal whether CCTV is genuinely effective or whether members of the public merely believe that it offers real crime control benefits, even though this belief may be mistaken and unfounded. In one recent study, more than nine in ten members of the public held the view that surveillance cameras in the shopping environment were acceptable — 91% in town centres and 96% in shopping centres (Beck and Willis, 1995; see also Honess and Charman, 1992). The ever-present cameras were seen as a symbolic and reassuring affirmation that crime was under control, something that would have the consequence of alleviating fear and anxiety about possible victimisation (which is good in itself) but also operating so as to encourage customers to part with their money (which is good for the retailer). Paradoxically, the security manager may want to play down the effectiveness of CCTV to the store staff in the interests of promoting their vigilance, but emphasise (or even exaggerate) its effectiveness so far as the shopping public is concerned in the interests of promoting a safe and secure shopping environment. The "reassurance" factor should not be underestimated because promoting customer confidence could be seen as a sufficient justification for its installation, irrespective of genuine crime control benefits.

The third major observation relates to the way in which expenditure on CCTV installations can be set against the benefits of average weekly reductions in losses due to theft. Although Tilley (1997) is sceptical about the feasibility of an authoritative cost benefit analysis, on the grounds that there are so many potential variables to consider, it is possible — using the retailers' emphasis on the "bottom line" — to offer a robust and meaningful measure. Retailers argue that there is only one key consideration: whether or not the expen-

diture on security equipment is more than compensated for by savings attributable to reductions in loss due to crime. The relevant data are unequivocal: taking the six-month review as the longer-term (and stronger) measure, the payback period for a £24K high-level CCTV system is 65 weeks, whereas because there is no measurable impact on loss for a £14K medium-level and a £4K low-level system, there is no prospect of these installations ever paying for themselves. Moreover, these figures represent the most optimistic payback scenarios because they include only the capital costs of CCTV installation and not the recurrent costs of manning the systems.

The hard-nosed retail manager will begin by wanting to know whether a given investment in CCTV will drive down the losses caused by crime, within a certain time frame, to a point that covers the expenditure on it. This is not only legitimate it is an inescapable feature of commercial life. Even where investment in CCTV cannot be justified in terms of a strict cost-benefit analysis, it could still be justified by wider social considerations such as reducing the fear of crime, or by sales and marketing considerations that use it to promote customers' perceptions of a safe and secure shopping environment. This is especially important because research shows that frightened customers who are concerned about crime and nuisance threats to safe shopping will relocate their shopping activities to locations deemed to be safe and secure rather than remain at those that are perceived to be intimidating and unsafe (Beck and Willis, 1995). Even here, the bottom-line analysis of costs against benefits is still crucial: it allows the company to be clear about the grounds for its decision making by articulating a reasoned departure from the bottom line of cost effectiveness.

CONCLUSION

A realistic and feasible evaluation of the impact of CCTV in the retail environment will need to move away from exploratory analysis (Ekblom, 1988) and focus on specific situational variables (Burrows and Speed, 1996) so as to indicate which context-specific mechanisms produce particular outcomes (Pawson and Tilley, 1997; Tilley, 1997). The study confirms that loss to sales figures, the number of units lost and their value all work as robust and "good enough" indicators of the likely impact of CCTV on theft. These may be imperfect but they are easy to collect routinely and they do reflect the private sector's emphasis on profit. The findings indicate that the most likely mechanism is that of deterrence, which is consistent with under-

standing crime either as the product of opportunity or as a function of rational choice. There is some evidence that the deterrent impact of CCTV diminishes over time, a fact that directs attention to the "publicity" given to it. But there is also a possibility that store staff become less security-conscious when the cameras are turned on. Finally, the cost-benefit analysis indicates that high-level systems alone "pay for themselves" in terms of reduced loss, which covers capital expenditure, although it is possible (and legitimate) to install CCTV for other reasons. The deployment of CCTV in the retail environment has measurable effects with particular explanations, which allows for more informed decision making about its future use and its contribution to crime prevention.

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