

Cyber Security for Small Businesses: A Review Of the Advice

Dray Agha, Robert Choudhury, Joe Rowell

Information Security Group, Royal Holloway, University of London,

1: Abstract

Cyber security advice given to SMEs often does not consider real-world constraints. However, the NCSC website offers the most contextualised, approachable advice for SMEs so far.

We evaluated the online literature from various industries, academic papers, and the NCSC website. We also utilised ethnographic experience working in and running SMEs ourselves.

2: Why SMEs?

SMEs account for 60% of UK private sector employment, and an overwhelming **three-quarters of cyber breaches occur at SMEs**. Up to 85% of SMEs have no money set aside to respond to a cyber attack, although **one in every two UK SMEs will suffer an attack**, and at least **half of those will shut down after a successful incursion**.

3: Industry advice

Large organisations have an interest in keeping SMEs cybersecure, as they are **interlinked in their supply chains**. SMEs security has been under-examined across the sectors. Industry has the most advice to offer, but there is **little examination into how effective industry advice has been for SMEs** (1). Cyber security has evolved from large companies and government, **hence the industry is orientated to focus on these large actors**.



Generic online advice on 'setting up' one's own SME offers no information about cyber security, and focuses on other priorities like branding etc. There is no advice on **how to effectively vet security vendors' and consultant's advice**, meaning an SME cannot be sure if they are being taken advantage, of or being advised well.

4: Academic Advice

Papers with advice on security controls do exist, but are **locked in journals behind pay-walls**. Another barrier is the language, style, and length of these papers – it is unlikely an SME will take the time to delve into these or have the prerequisite knowledge to understand them.

Research is near absent on the economics of implementing information security. Some papers entirely ignore costs when they talk about solutions. Despite the assumption that an adversary has significant resources, there is **no widespread assumption in papers that a defender may exist who has few resources**.

5: Government Advice

The NCSC is a new but excellent source of advice for SME owners. Their website has **sector-specific**, straightforward advice. However, one barrier may be SMEs **knowing this source exists**. In addition, there is an assumption an SME decision maker has the knowledge to correctly utilise this advice - for example, using two-factor authentication.

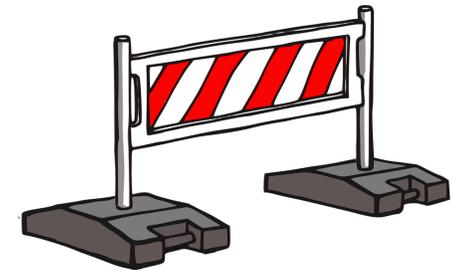
It is flawed assumption that SME companies would be suspicious of government advice in a post-Snowden context (2). In reality, this is not something SME owners even factor in when seeking advice. **Time and money are the dominant 'threats' to an SME owner**, not Big Brother.

6: SMEs Constraints

Some advice ignores real-world constraints SMEs may have:

- Advising regular updates ignores that some **businesses won't allow their machines to be temporarily out of use**, and they may not know how to perform such updates.
- SME owners have to balance the costs of spending time on adding cyber-security training, on top of **other employee training needs**, which all takes employees out of productive action for hours.
- Advice on assessing assets, risks, and resources often comes without the **education of what risk management** is in a cyber security context, and how to go about it.

- Advice on email phishing focuses on the context and methods of social engineering, and ignores **what SMEs should do immediately if an employee clicks on a malicious link** - The NCSC was one of the few advisers who noted SMEs should **change passwords and scan for malware**, and not deploy on punitive measures against staff.
- **SME owners have to put significant personal information about themselves online** in order to advertise. An adversary gains a significant advantage from this open pool of personal information.



7: Lifting Barriers

Motivation for future research could consider:

- **SMEs need tailored attention** from industry and academia
- **The NCSC could have written advice distributed** by companies house upon the establishment of a new business.
- **Updated advice should be advertised in a range of media** so that it increases the chance of being seen by the decision makers of SME. Examples of this are newspapers and posters as well as experts attending events that are frequented by the owners of SMEs.

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