### 3.1.2 Market assessment

#### Table 29. Market assessment for anti-fingerprint nanocoatings.

| Category | | |
|----------|-------------------------------------------------------------|
| **Nanomaterials used** | • Silicon dioxide nanoparticles.  
| | • Aluminium oxide nanoparticles.  
| | • Titanium dioxide nanoparticles. |
| **Principle** | • Protection of metal surfaces against fingerprints with a fine nanocomposite coating, which maintains the metal optic. This involves establishment of surface with low surface free energy followed by establishing extremely flat surface using nanoparticles.  
| | • The surface significantly reduces fingerprints and other contaminantants. As adhesion of fingerprints is reduced, oxidation will not take place and hence increases durability. Also, time to clean the surface will reduce significantly.  
| | • By smart modification there is a substantial improvement in cleaning ability.  
| | • Two types of coatings are typically used in anti-fingerprint coatings, Lipophilic or Oil repellent (superoleophobic or omniphobic). Photocatalytic coatings have also been investigated.  
| | • Anti-fingerprint surface can include a structure including a transparent substrate and a multi-layer nanoparticle structure residing on the substrate, where the multi-layer structure comprising an outermost layer of nanoparticles.  
| | • Nanoparticle size and thickness of the multilayers can be selected to maximize a photocatalytic effect and to minimize light scattering.  
| | • Use of nanoparticles can also provide additional selected functionality e.g. anti-reflectivity, anti-fogging, anti-scratch, or anti-bacterial. |
| **Properties** | • Very good adhesion.  
| | • Transparent or slight mat, i.e. the metallic surface character is saved.  
| | • High abrasion resistance.  
| | • High chemical stability against acids and alkali (10 % sulphuric acid, 10% soda lye).  
| | • Additional antibacterial (biocide) properties or graffiti protection is possible. |
| **Application** | • Water-based respectively low-solvent-containing coating fluid for stainless steel, cooper, brass and other metals.  
| | • Simple application e.g. by spray dip coating.  
| | • Curing either at room temperature or thermal curing between 60°C and 150°C. |
| **Effect** | • Strong reduction of the visibility of fingerprints.  
| | • Prevention of the blue tarnishing of the stainless surface (corrosion/oxidation by salts and organic acids from finger sweat).  
| | • Prevention of unsightly smears. Fingerprints are optically less noticed and don’t leave any traces of oxidation (tarnishing of the metal). The effect is based upon the reduction of the optical contrast caused by a fingerprint. The user is able to enjoy an appropriately clear image even after longer and intensive periods of use.  
| | • Less cleaning effort: Fingerprints can be removed easily and without residue, e.g. with a paper cloth.  
| | • Suited for structured surfaces (e.g. brushed), unsuited for high polished surfaces.  
| | • Very thin transparent coating (0.5 – 4.0 µ). |